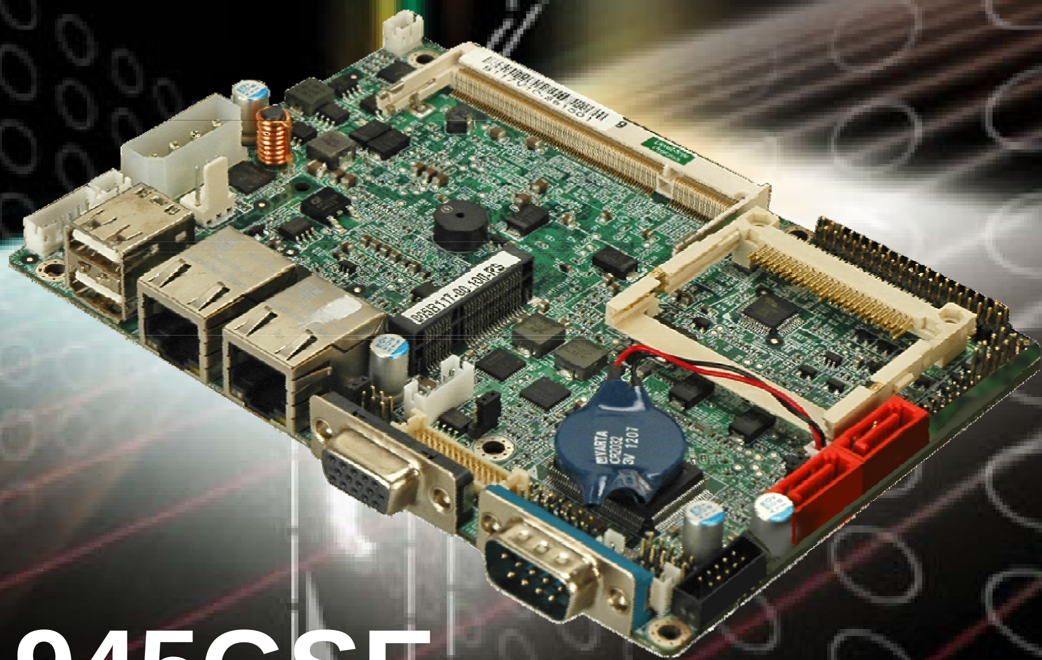


MODEL:

WAFER-945GSE

3.5" SBC with Intel® Atom™ Processor with support for VGA and LVDS Displays, Dual PCIe GbE, CF Type II, and SATA

User Manual

Rev. 2.02 – August 27, 2015

Revision

Date	Version	Changes
August 27, 2015	2.02	Updated Section 1.4: Dimensions Updated Section 4.5: Chassis Installation
April 20, 2012	2.01	Updated Section 1.4: Dimensions
September 20, 2011	2.00	Updated for R20 version
August 23, 2011	1.04	Modified SATA connector description
June 15, 2009	1.03	Modified LVDS connector description in Section 3.2.10
March 12, 2009	1.02	Changed model name
January 8, 2009	1.01	Added a warning for using heat sink enclosure in Section 4.5.1
November 4, 2008	1.00	Initial release

Copyright

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TRADEMARKS

Manual Conventions

WARNING

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

CAUTION

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

NOTE

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

HOT SURFACE

This symbol indicates a hot surface that should not be touched without taking care.

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Chapter 1

Introduction

1.1 Introduction

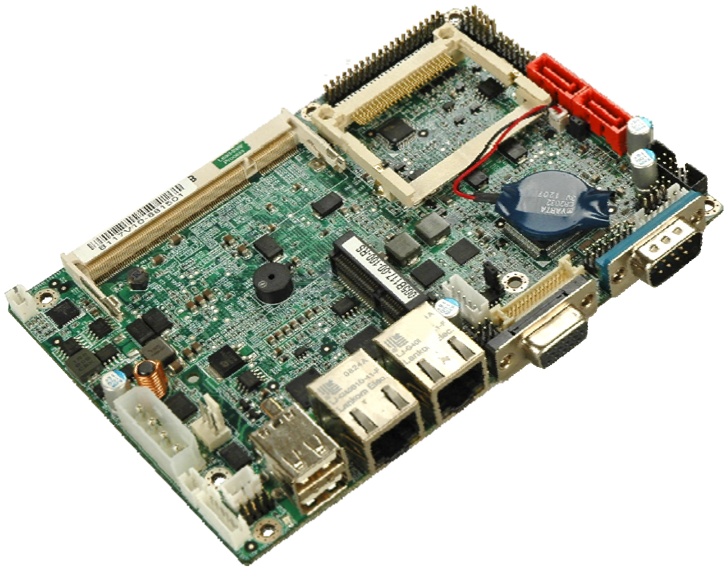


Figure 1-1: WAFER-945GSE

The WAFER-945GSE 3.5" motherboards are embedded 45 nm Intel® Atom™ processor platforms. The Intel® Atom™ processor N270 embedded on the WAFER-945GSE has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The WAFER-945GSE also supports one 200-pin 533 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM. The board comes with an LVDS connector and supports both 18-bit and 36-bit single channel LVDS screens. The WAFER-945GSE also comes with two PCI Express (PCIe) Gigabit Ethernet (GbE) connectors and a PCIe mini slot on the solder side.

1.2 Model Variations

The model variations of the WAFER-945GSE Series are listed below.

Model No.	CPU	Operating Temperature
WAFER-945GSE-N270-R20	Intel® Atom™ N270 1.6 GHz	0ºC ~ 60ºC
WAFER-945GSE-N270W-R20	Intel® Atom™ N270 1.6 GHz	-20ºC ~ 70ºC
WAFER-945GSE-N270W2-R20	Intel® Atom™ N270 1.6 GHz	-40ºC ~ 85ºC

Table 1-1: WAFER-945GSE Model Variations

1.3 Connectors

The connectors on the WAFER-945GSE are shown in the figure below.

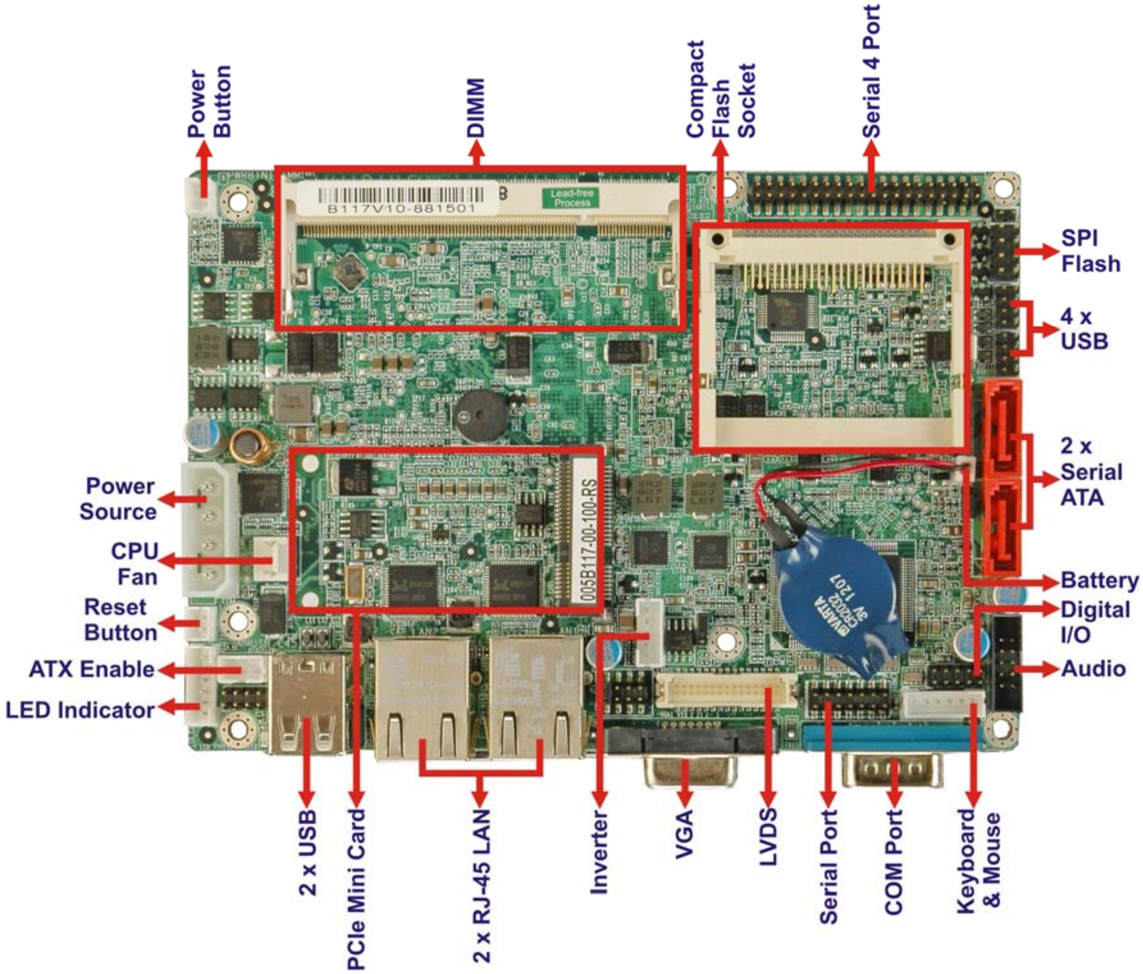


Figure 1-2: Connectors

The WAFER-945GSE has the following connectors on-board:

- 1 x ATX power connector
- 1 x ATX enable connector
- 1 x Audio connector
- 1 x Backlight inverter connector
- 1 x CompactFlash® socket
- 1 x Digital input/output (DIO) connector
- 1 x Fan connector

- 1 x Keyboard and mouse connector
- 1 x LED connector
- 1 x LVDS connector
- 1 x PCIe Mini Card slot
- 1 x Power button connector
- 1 x Reset button connector
- 1 x 4-port RS-232 serial port connector
- 1 x RS-232/422/485 serial port connector
- 2 x Serial ATA (SATA) drive connectors
- 1 x SPI flash connector
- 2 x USB 2.0 connectors (supports four USB 2.0 devices)

The WAFER-945GSE has the following external peripheral interface connectors on the board rear panel.

- 2 x Ethernet connectors
- 1 x Serial port connector
- 2 x USB connectors
- 1 x VGA connector

The WAFER-945GSE has the following on-board jumpers:

- AT Power Mode Setting
- Clear CMOS
- CF card setup
- LVDS1 Voltage Selection
- LVDS1 Panel Resolution Selection
- COM2 Port Mode setting

1.4 Dimensions

The main dimensions of the WAFER-945GSE and its heat sink enclosure are shown in the diagrams below:

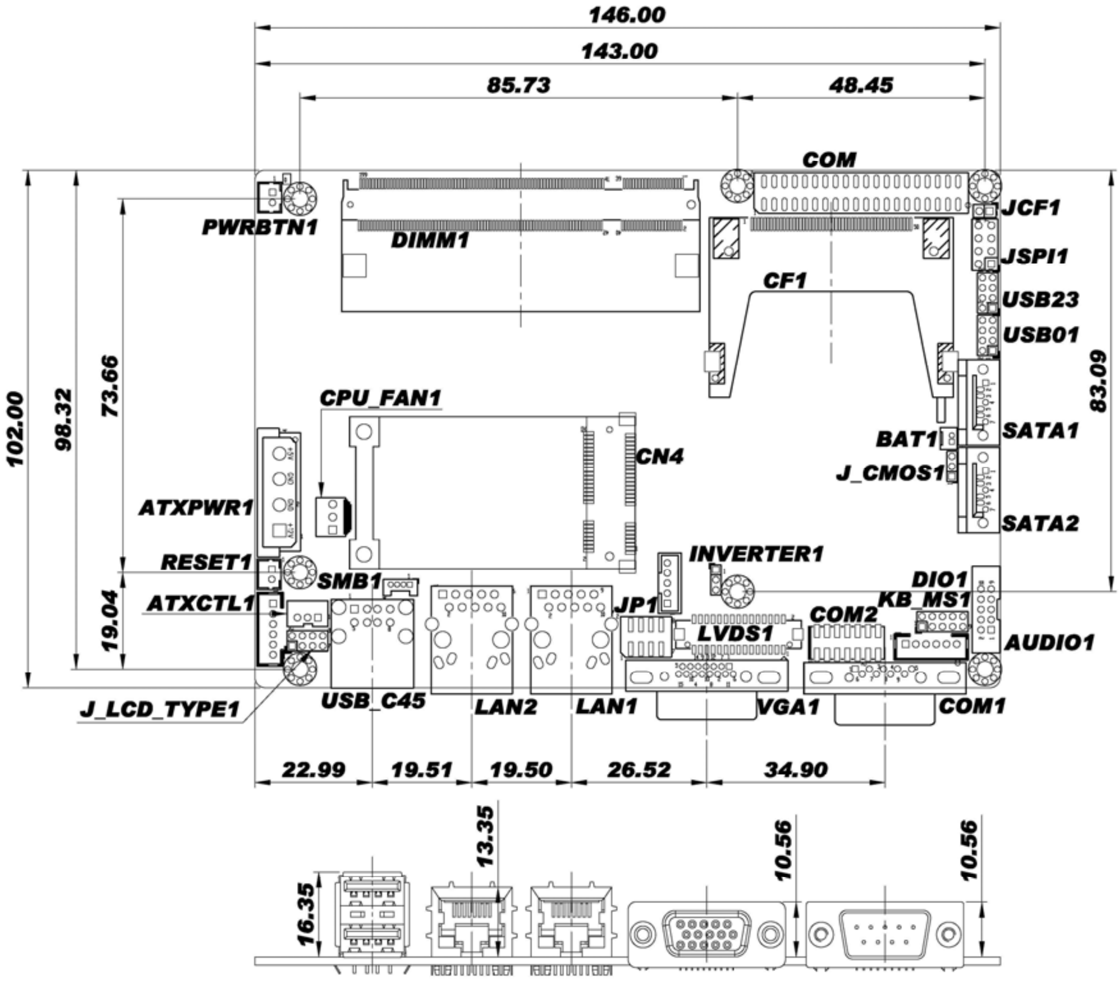


Figure 1-3: WAFER-945GSE Dimensions (mm)

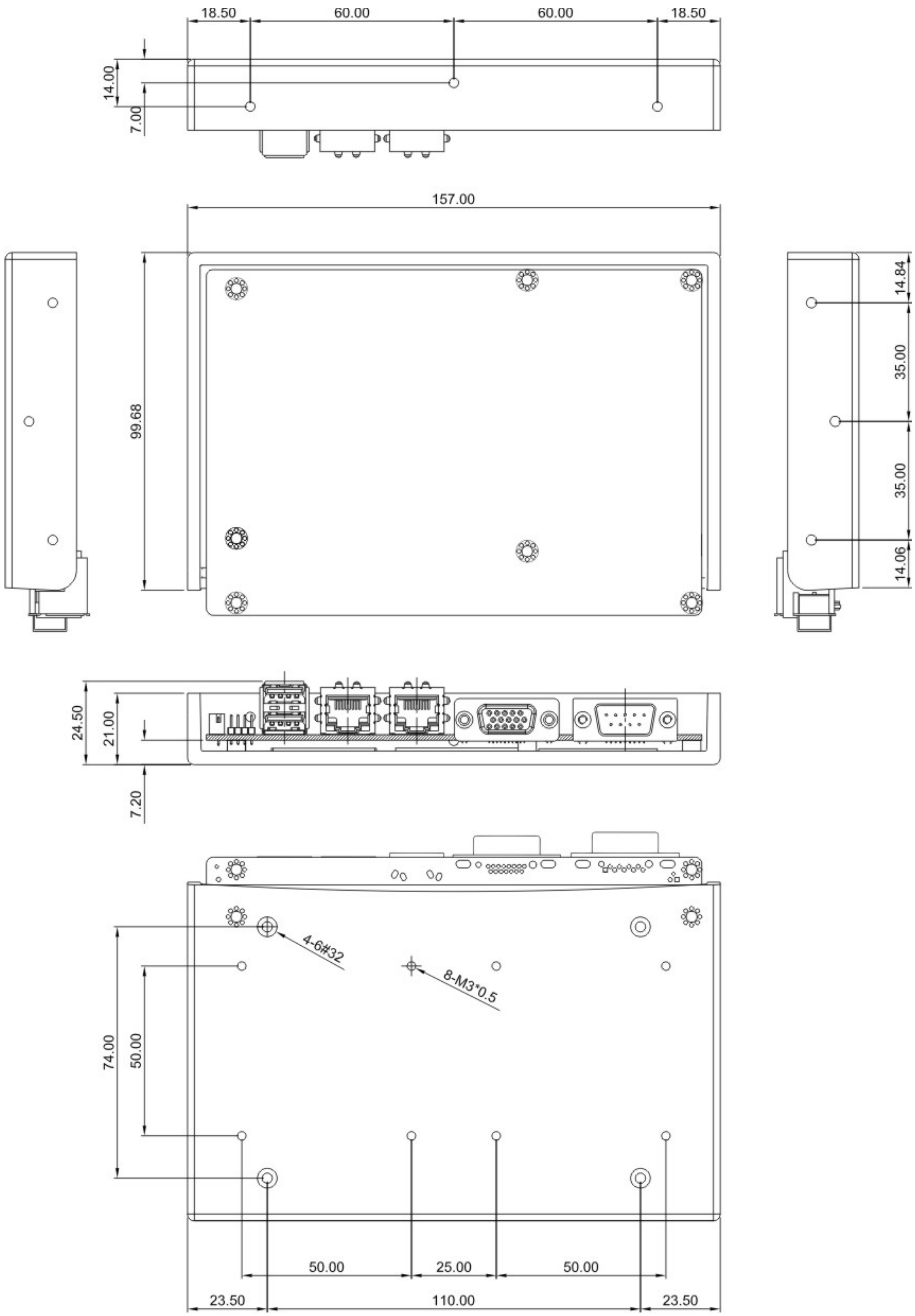


Figure 1-4: Heat Sink Enclosure Dimensions (mm)

1.5 Data Flow

Figure 1-5 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

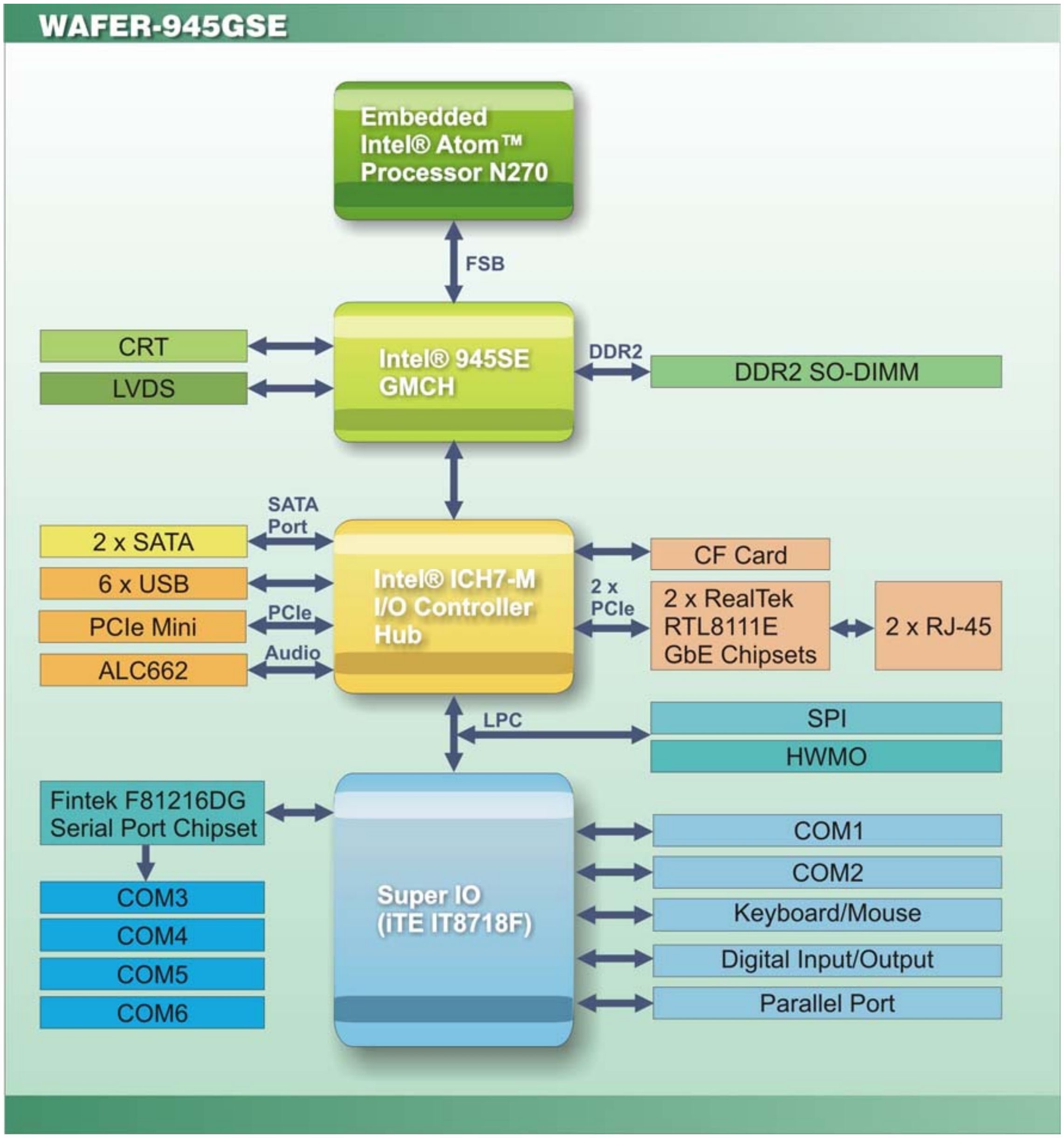


Figure 1-5: Data Flow Diagram

1.6 Technical Specifications

WAFER-945GSE technical specifications are listed below.

Specification/Model	WAFER-945GSE
Form Factor	3.5”
System CPU	45 nm 1.6 GHz Intel® Atom™ N270
Front Side Bus (FSB)	533 MHz
System Chipset	Northbridge: Intel® 945GSE Southbridge: Intel® ICH7-M
Memory	One 200-pin SO-DIMM socket supports one 400 MHz or 533 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM
CompactFlash®	One CompactFlash® Type II socket
Super I/O	ITE IT8718
Display	Intel® Generation 3.5 integrated GFX core (133 MHz) 18-bit dual channel LVDS integrated in Intel® 945GSE Dual-display supported (VGA and LVDS)
BIOS	AMI BIOS label
Audio	Realtek ALC662 HD Audio codec
LAN	Two Realtek RTL8111E GbE controllers with ASF2.0 support
COM	Five RS-232 serial ports One RS-232/422/485 serial port
USB 2.0	Six USB 2.0 devices supported: Four by onboard pin-headers Two by external connectors
SATA	Two 3.0 Gb/s SATA drives supported
Keyboard/mouse	One internal pin-header connector
Expansion	One PCIe mini card (PCIe bus)

Specification/Model	WAFER-945GSE
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8718 super I/O
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Power Supply	5.0 V only 12 V for LCD/System Fan AT and ATX support
Power Consumption	5V @ 2.94 A (1.6 GHz Intel® Atom™ with one 1.0 GB DDR2 SO-DIMM)
Temperature	0ºC ~ 60ºC
Humidity (operating)	5% ~ 95% (non-condensing)
Dimensions (LxW)	146 mm x 102 mm
Weight (GW/NW)	700 g / 230 g

Table 1-2: WAFER-945GSE Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the WAFER-945GSE is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the WAFER-945GSE was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The WAFER-945GSE is shipped with the following components:

Quantity	Item and Part Number	Image
1	WAFER-945GSE motherboard	
2	SATA cable (**P/N**: 32000-062800-RS)	
1	KB/MS Cable (**P/N**: 32000-023800-RS)	
1	Audio cable (**P/N:** 32000-072100-RS)	
1	Enclosure heat sink	
1	4 COM (wo bracket) (**P/N**: 32200-025401-RS)	

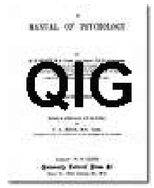
Quantity	Item and Part Number	Image
1	Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	
1	Utility CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

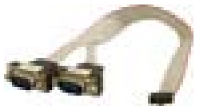
Item and Part Number	Image
Dual USB cable (wo bracket) (**P/N**: 32000-070301-RS)	
RS-232/422/485 cable (**P/N**:32200-026500-RS)	
ATX cable (**P/N**: 32100-052100)	
SATA power cable (**P/N**: 32100-088600-RS)	
4 COM (w bracket) (**P/N**: IO-KIT-4COM-R10)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 WAFER-945GSE Layout

The figures below show all the connectors and jumpers.

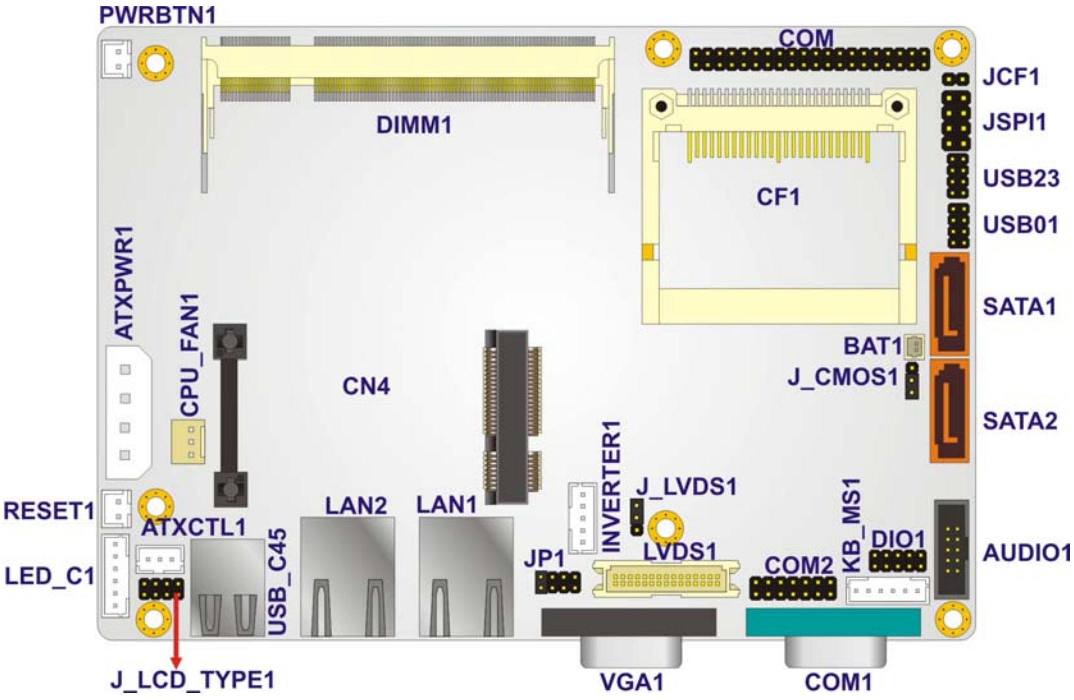


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX enable connector	3-pin wafer	ATXCTL1
ATX power connector	4-pin ATX	ATXPWR1
Audio connector	10-pin header	AUDIO1
Backlight inverter connector	5-pin wafer	INVERTER1
CompactFlash® socket	50-pin CF socket	CF1

Connector	Type	Label
Digital input/output (DIO) connector	10-pin header	DIO1
Fan connector	3-pin wafer	CPU_FAN1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LED connector	6-pin header	LED_C1
LVDS connector	30-pin crimp	LVDS1
PCIe Mini Card slot	PCIe Mini Slot	CN4
Power Button	2-pin wafer	PWRBTN1
Reset button connector	2-pin header	RESET1
RS-232 serial port connector (COM3 ~ COM6)	40-pin header	COM
RS-232/422/485 serial port connector	14-pin header	COM2
Serial ATA (SATA) drive connectors	7-pin SATA	SATA1
Serial ATA (SATA) drive connectors	7-pin SATA	SATA2
SPI flash connector	8-pin header	JSPI1
USB 2.0 connector	8-pin header	USB01
USB 2.0 connector	8-pin header	USB23

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
RS-232 serial port connector	Male DB-9	COM1
Dual USB port	USB port	USB_C45
VGA port connector	15-pin female	VGA1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the WAFER-945GSE.

3.2.1 ATX Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin ATX power connector

CN Location: See **Figure 3-2**

CN Pinouts: See **Table 3-3**

The ATX power connector connects to an ATX power supply.

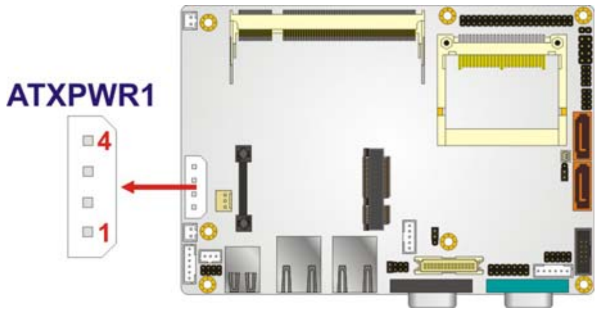


Figure 3-2: ATX Power Connector Location

Pin	Description
1	+12V
2	GND
3	GND
4	+5V

Table 3-3: ATX Power Connector Pinouts

3.2.2 ATX Power Supply Enable Connector

CN Label: **ATXCTL1**

CN Type: 3-pin wafer

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-4**

The ATX power supply enable connector enables the WAFER-945GSE to be connected to an ATX power supply. In default mode, the WAFER-945GSE can only use an AT power supply. To enable an ATX power supply, the AT Power Select jumper must also be configured. Please refer to Chapter 4 for more details.

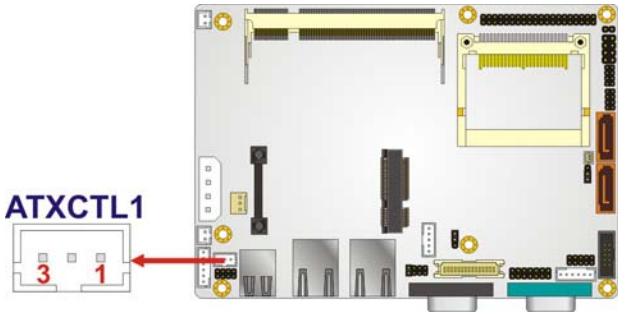


Figure 3-3: ATX Power Supply Enable Connector Location

Pin	Description
1	+5V Standby
2	GND
3	PS-ON

Table 3-4: ATX Power Supply Enable Connector Pinouts

3.2.3 Audio Connector (10-pin)

CN Label: **AUDIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-5**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

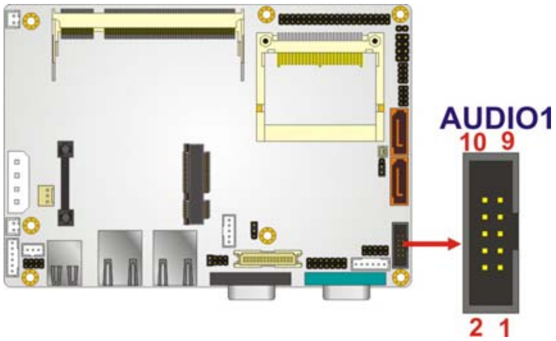


Figure 3-4: Audio Connector Pinouts (10-pin)

Pin	Description	Pin	Description
1	Line out R	2	Line in R
3	GND	4	GND
5	Line out L	6	Line in L
7	GND	8	GND
9	MIC in	10	Mic in

Table 3-5: Audio Connector Pinouts (10-pin)

3.2.4 Backlight Inverter Connector

CN Label: **INVERTER1**

CN Type: 5-pin wafer

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-6**

The backlight inverter connectors provide the backlights on the LCD display connected to the WAFER-945GSE with +12V of power.

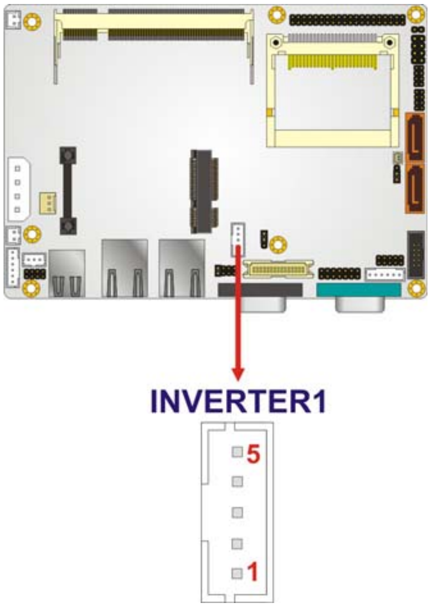


Figure 3-5: Panel Backlight Connector Location

Pin	Description
1	LCD Backlight Control
2	GND
3	+12V
4	GND
5	BACKLIGHT Enable

Table 3-6: Panel Backlight Connector Pinouts

3.2.5 CompactFlash® Socket

CN Label: **CF1**

CN Type: 50-pin header

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

A CF Type I or Type II memory card can be inserted to the CF socket on the WAFER-945GSE.

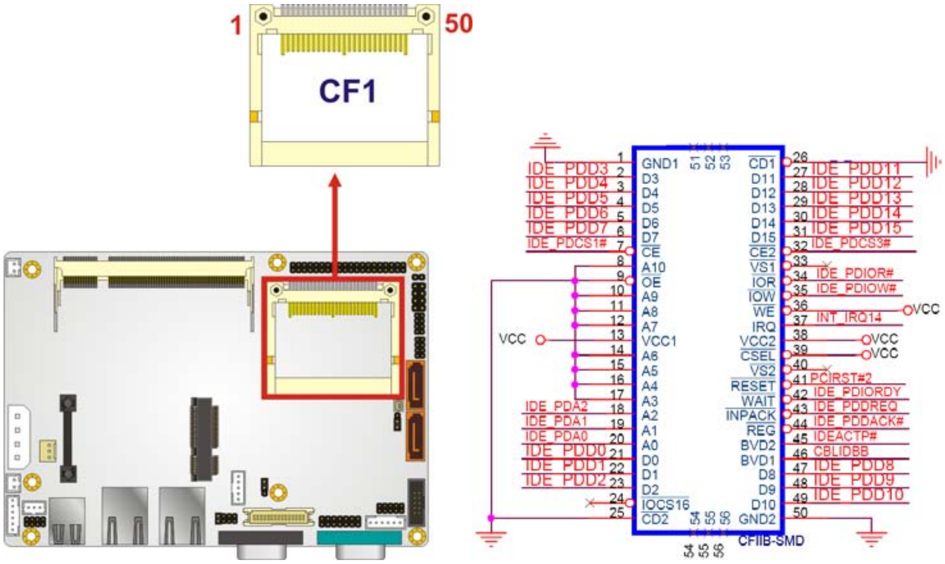


Figure 3-6: CF Card Socket Location

Pin	Description	Pin	Description
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	GROUND	33	N/C
9	GROUND	34	IOR#
10	GROUND	35	IOW#
11	GROUND	36	VCC_COM
12	GROUND	37	IRQ14
13	VCC_COM	38	VCC_COM
14	GROUND	39	CSEL
15	GROUND	40	N/C
16	GROUND	41	HDD_RESET
17	GROUND	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#

Pin	Description	Pin	Description
20	SA0	45	66DET
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-7: CF Card Socket Pinouts

3.2.6 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-8**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

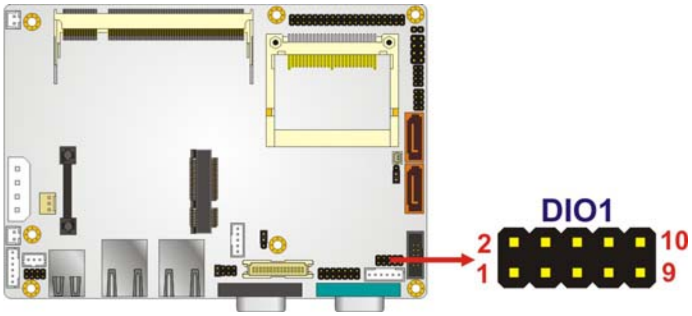


Figure 3-7: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-8: Digital I/O Connector Pinouts

3.2.7 Fan Connector (+12V, 3-pin)

CN Label: **CPU_FAN1**

CN Type: 3-pin wafer

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

The cooling fan connector provides a 12V, 500mA current to the cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

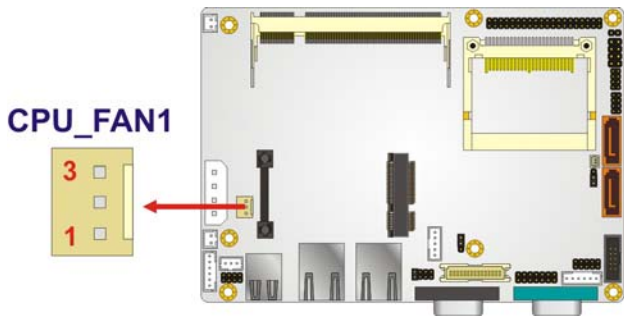


Figure 3-8: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	Fan Speed Detect

Table 3-9: +12V Fan Connector Pinouts

3.2.8 Keyboard/Mouse Connector

CN Label: **KB_MS1**

CN Type: 6-pin wafer

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

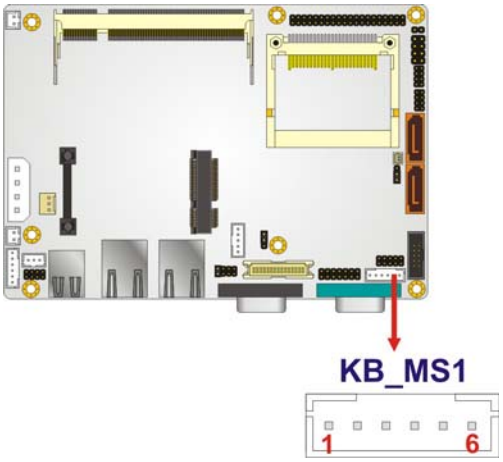


Figure 3-9: Keyboard/Mouse Connector Location

Pin	Description
1	+5 V KB DATA
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 3-10: Keyboard/Mouse Connector Pinouts

3.2.9 LED Connector

CN Label: **LED_C1**

CN Type: 6-pin wafer

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-11**

The LED connector connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.

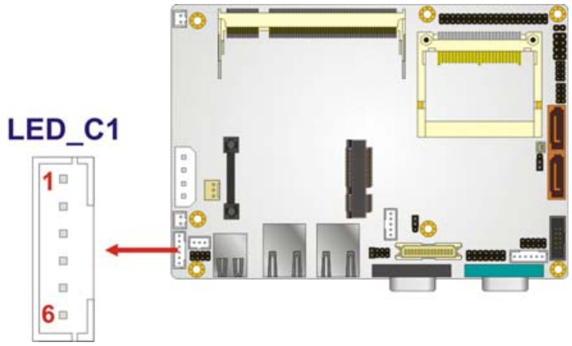


Figure 3-10: LED Connector Location

Pin	Description
1	+5V
2	GND
3	Power LED+
4	Power LED-
5	HDD LED+
6	HDD LED-

Table 3-11: LED Connector Pinouts

3.2.10 LVDS LCD Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-12**

The 30-pin LVDS LCD connector can be connected to single channel or dual channel, 18-bit or 36-bit LVDS panel.

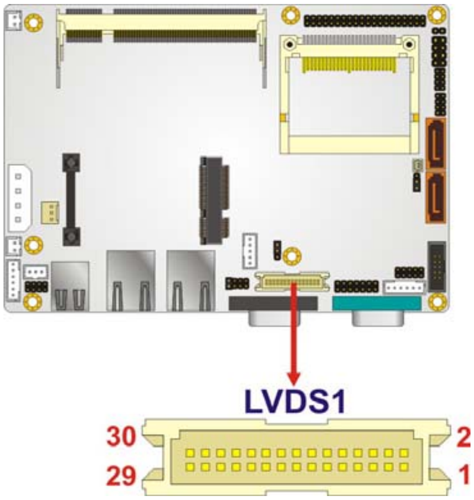


Figure 3-11: LVDS LCD Connector Pinout Locations

Pin	Description	Pin	Description
1	GND1	2	GND2
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	NC	12	NC
13	GND3	14	GND4
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	NC	24	NC
25	GND5	26	GND6
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 3-12: LVDS LCD Port Connector Pinouts

3.2.11 PCIe Mini Card Slot

CN Label: **CN4**

CN Type: 52-pin Mini PCIe Card Slot

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

The PCIe mini card slot enables a PCIe mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards.

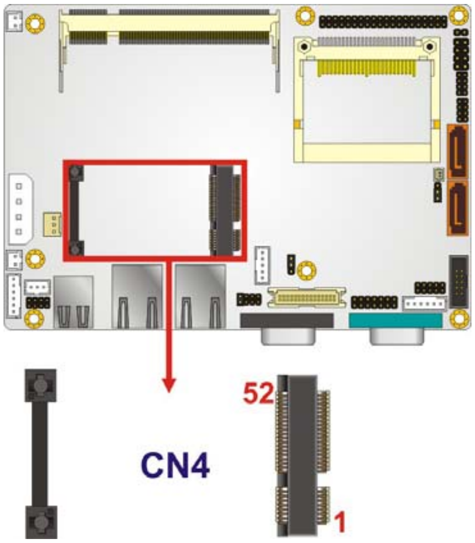


Figure 3-12: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	CLKREQ#	8	LFRAME#
9	GND	10	LAD3
11	CLK-	12	LAD2
13	CLK+	14	LAD1
15	GND	16	LAD0
17	PCIRST#	18	GND

Pin	Description	Pin	Description
19	LPC	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C
43	N/C	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 3-13: PCIe Mini Card Slot Pinouts

3.2.12 Power Button Connector

CN Label: **PWRBTN1**

CN Type: 2-pin wafer

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-14**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.

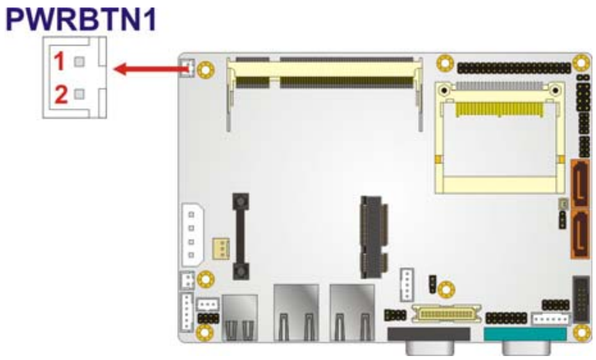


Figure 3-13: Power Button Connector Location

Pin	Description
1	Power Switch
2	GND

Table 3-14: Power Button Connector Pinouts

3.2.13 Reset Button Connector

CN Label: **RESET1**

CN Type: 2-pin wafer

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-15**

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.

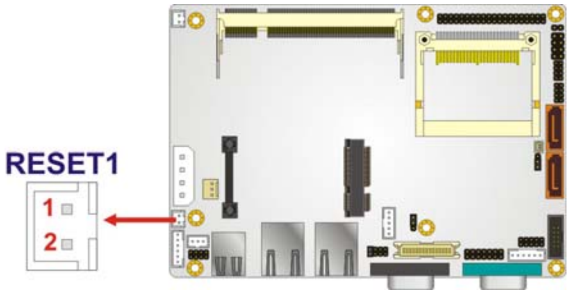


Figure 3-14: Reset Button Connector Location

Pin	Description
1	Reset Switch
2	GND

Table 3-15: Reset Button Connector Pinouts

3.2.14 SATA Drive Connectors

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-16**

The SATA drive connectors can be connected to SATA drives and support up to 3Gb/s data transfer rate.

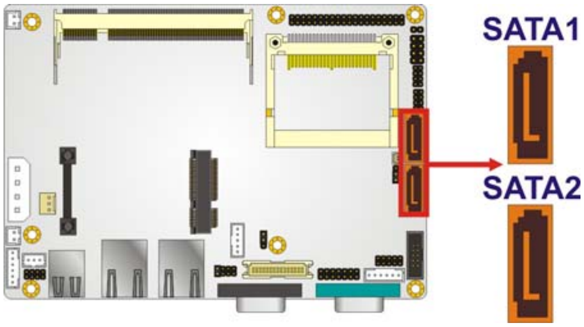


Figure 3-15: SATA Drive Connector Locations

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-16: SATA Drive Connector Pinouts

3.2.15 Serial Port Connectors, RS-232

CN Label: **COM3, COM4, COM5, COM6**

CN Type: 40-pin header

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-17**

The 40-pin serial port connector contains the following four serial ports: COM3, COM4, COM5 and COM6. All these serial ports are RS-232 serial communications channels. The serial port locations are specified below.

- COM3 is located on pin 1 to pin 10
- COM4 is located on pin 11 to pin 20
- COM5 is located on pin 21 to pin 30
- COM6 is located on pin 31 to pin 40

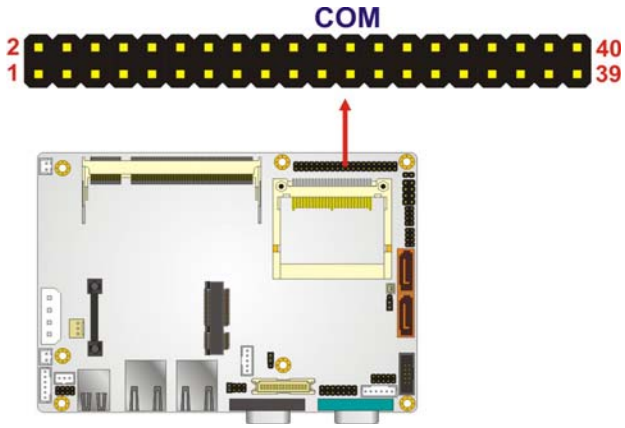


Figure 3-16: COM3 to COM6 Connector Pinout Locations

Pin	Description	Pin	Description
1	DATA CARRIER DETECT (DCD3)	2	DATA SET READY (DSR3)
3	RECEIVE DATA (RXD3)	4	REQUEST TO SEND (RTS3)
5	TRANSMIT DATA (TXD3)	6	CLEAR TO SEND (CTS3)
7	DATA TERMINAL READY (DTR3)	8	RING INDICATOR (RI3)
9	GND	10	GND
11	DATA CARRIER DETECT (DCD4)	12	DATA SET READY (DSR4)

Pin	Description	Pin	Description
13	RECEIVE DATA (RXD4)	14	REQUEST TO SEND (RTS4)
15	TRANSMIT DATA (TXD4)	16	CLEAR TO SEND (CTS4)
17	DATA TERMINAL READY (DTR4)	18	RING INDICATOR (RI4)
19	GND	20	GND
21	DATA CARRIER DETECT (DCD5)	22	DATA SET READY (DSR5)
23	RECEIVE DATA (RXD5)	24	REQUEST TO SEND (RTS5)
25	TRANSMIT DATA (TXD5)	26	CLEAR TO SEND (CTS5)
27	DATA TERMINAL READY (DTR5)	28	RING INDICATOR (RI5)
29	GND	30	GND
31	DATA CARRIER DETECT (DCD6	32	DATA SET READY (DSR6)
33	RECEIVE DATA (RXD6)	34	REQUEST TO SEND (RTS6)
35	TRANSMIT DATA (TXD6	36	CLEAR TO SEND (CTS6)
37	DATA TERMINAL READY (DTR6	38	RING INDICATOR (RI6)
39	GND	40	GND

Table 3-17: COM3 to COM6 Connector Pinouts

3.2.16 Serial Port Connector, RS-232/422/485

CN Label: **COM2**

CN Type: 14-pin header

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-18**

The 14-pin serial port connector connects to the COM2 serial communications channels. COM2 is a multi function channel. In default mode COM2 is an RS-232 serial communication channel but, with the COM2 function select jumper, can be configured as either an RS-422 or RS-485 serial communications channel.

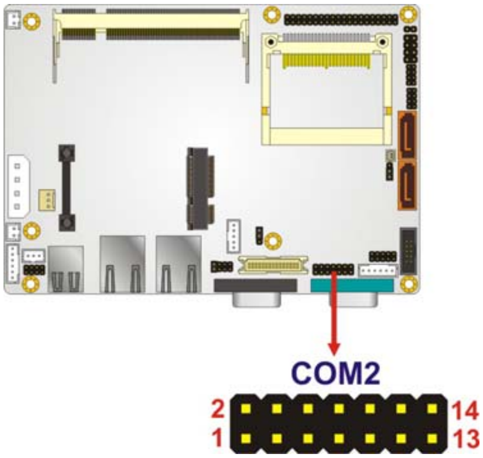


Figure 3-17: RS-232/422/485 Serial Port Connector Location

Pin	Description	Pin	Description
1	NDCD	2	NDSR2
3	NRX	4	NRTS2
5	NTX	6	NCTS2
7	NDTR	8	NRI2
9	GND	10	GND
11	TXD485+	12	TXD485
13	RXD485+	14	RXD485#

Table 3-18: RS-232/422/485 Serial Port Connector Pinouts

3.2.17 SPI Flash Connector

CN Label: **JSPI1**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-19**

The 8-pin SPI Flash connector is used to flash the BIOS.

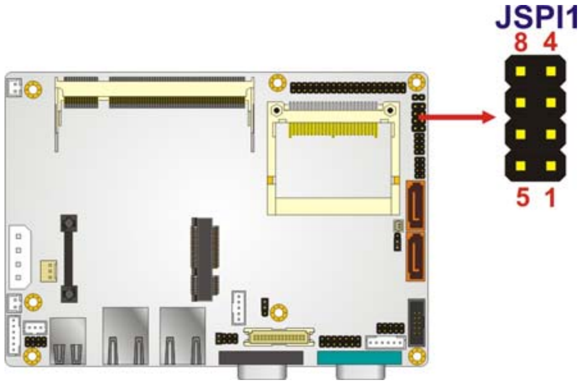


Figure 3-18: SPI Flash Connector

Pin	Description	Pin	Description
1	VCC	2	GND
3	CS#	4	CLOCK
5	SO	6	SI
7	NC	8	NC

Table 3-19: SPI Flash Connector

3.2.18 USB Connectors (Internal)

CN Label: **USB01** and **USB23**

CN Type: 8-pin header

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

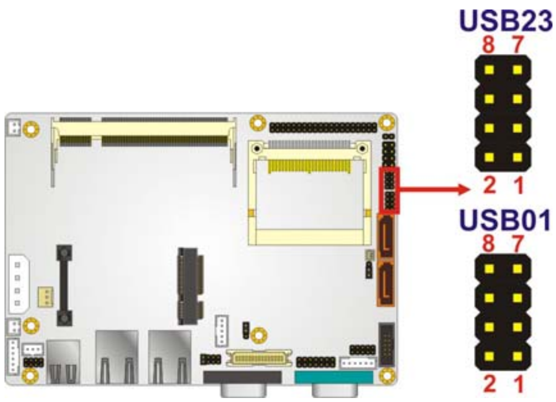


Figure 3-19: USB Connector Pinout Locations

Pin	Description	Pin	Description
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-20: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

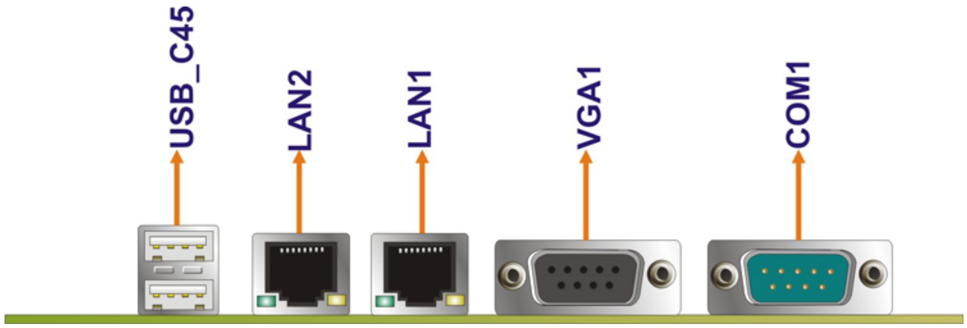


Figure 3-20: External Peripheral Interface Connector

3.3.1 Ethernet Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45 connector

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-21**

The WAFER-945GSE is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

Pin	Description	Pin	Description
1	MDIA3-	2	MDIA3+
3	MDIA2-	4	MDIA1-
5	MDIA1+	6	MDIA2+
7	MDIA0-	8	MDIA0+

Table 3-21: LAN Pinouts

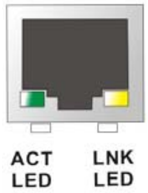


Figure 3-21: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-22**.

Status	Description	Status	Description
Green	Activity	Yellow	Linked

Table 3-22: RJ-45 Ethernet Connector LEDs

3.3.2 Serial Port Connectors (COM1)

CN Label: **COM1**

CN Type: DB-9 connector

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-23** and **Figure 3-22**

The serial port connects to a RS-232 serial communications device.

Pin	Description	Pin	Description
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 3-23: RS-232 Serial Port (COM 1) Pinouts

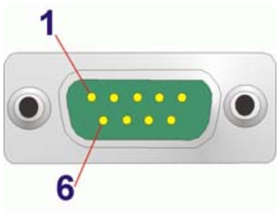


Figure 3-22: COM1 Pinout Locations

3.3.3 USB Connectors

CN Label: **USB_C45**

CN Type: Dual USB port

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-24**

The WAFER-945GSE has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description	Pin	Description
1	VCC (+5V)	5	VCC (+5V)
2	DATA4-	6	DATA5-
3	DATA4+	7	DATA5+
4	GND	8	GND

Table 3-24: USB Port Pinouts

3.3.4 VGA Connector

CN Label: **VGA1**

CN Type: 15-pin Female

CN Location: See **Figure 3-20**

CN Pinouts: See **Figure 3-23** and **Table 3-25**

The WAFER-945GSE has a single 15-pin female connector for connectivity to standard display devices.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	CRT_PLUG-
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-25: VGA Connector Pinouts

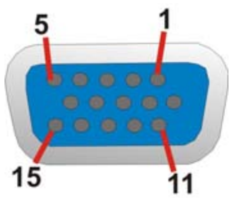


Figure 3-23: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the WAFER-945GSE may result in permanent damage to the WAFER-945GSE and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-945GSE. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-945GSE or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the WAFER-945GSE, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-945GSE.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - o The user manual provides a complete description of the WAFER-945GSE installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the WAFER-945GSE on an antistatic pad:
  - o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the WAFER-945GSE off:
  - o When working with the WAFER-945GSE, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the WAFER-945GSE **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 SO-DIMM and CF Card Installation

4.3.1 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanent damage to the WAFER-945GSE. Please make sure the purchased SO-DIMM complies with the memory specifications of the WAFER-945GSE. SO-DIMM specifications compliant with the WAFER-945GSE are listed in **Chapter 1**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 4-1**.

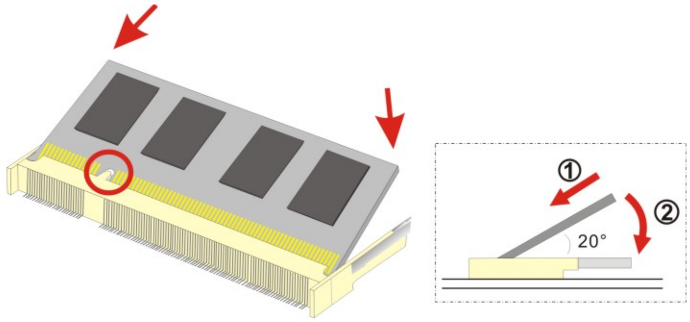


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the WAFER-945GSE on an anti-static pad.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 4-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

4.3.2 CF Card Installation

To install the CF card (Type 1 or Type 2) onto the WAFER-945GSE, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the WAFER-945GSE on an anti-static pad. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 4-2**.

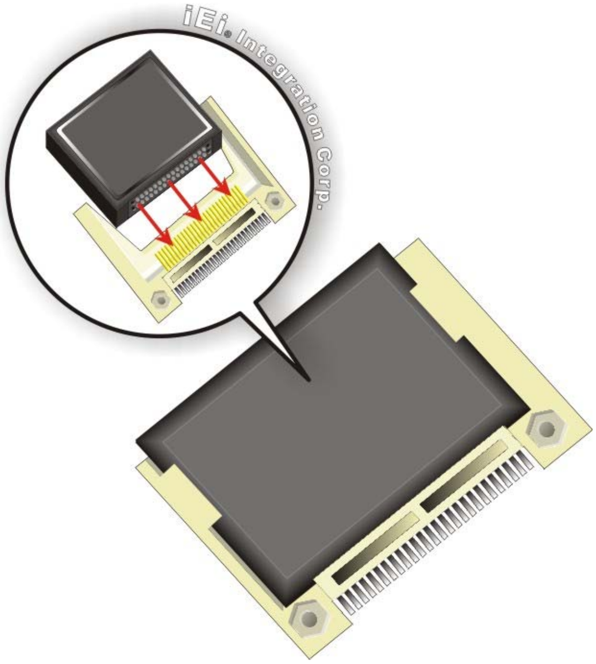
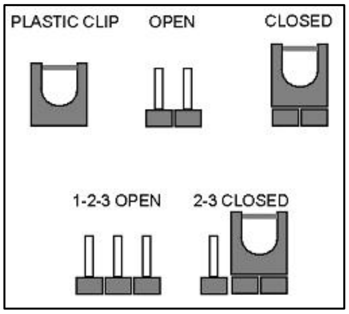


Figure 4-2: CF Card Installation

4.4 Jumper Settings

NOTE:



A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

The hardware jumpers must be set before installation. Jumpers are shown in **Table 4-1**.

Description	**Label**	**Type**
AT Power Mode Setting	ATXCTL1	3-pin header
CF Card Setting	JCF1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
COM2 Mode Setting	JP1	8-pin header
LVDS1 Panel Resolution	J_LCD_TYPE1	8-pin header
LVDS1 Voltage Select	J_VLVDS1	3-pin header

Table 4-1: Jumpers

4.4.1 AT Power Select Jumper

NOTE:

The AT Power Select Jumper is the same as the ATX Enable connector.

Jumper Label: **ATXCTL1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-2**

Jumper Location: See **Figure 4-3**

The AT Power Select jumper specifies the systems power mode as AT or ATX.

Setting	Description
Short 2-3	Use AT power (Default)
OFF	Use ATX power

Table 4-2: AT Power Select Jumper Settings

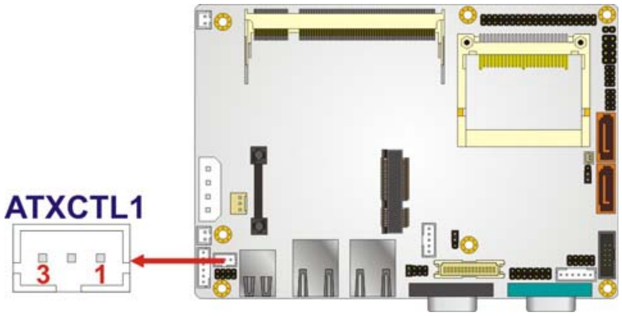


Figure 4-3: AT Power Select Jumper Location

4.4.2 CF Card Setup

Jumper Label: **JCF1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 4-3**

Jumper Location: See **Figure 4-4**

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device.

Setting	Description
OFF	Slave (Default)

Setting	Description
Short 1-2	Master

Table 4-3: CF Card Setup Jumper Settings

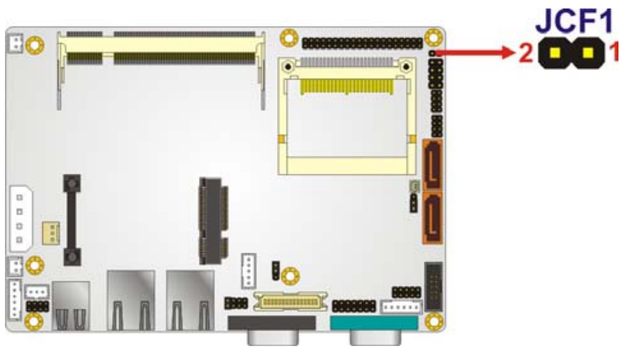


Figure 4-4: CF Card Setup Jumper Location

4.4.3 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-4**

Jumper Location: See **Figure 4-5**

If the WAFER-945GSE fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

Setting	Description
Short 1-2	Keep CMOS Setup (Default)
Short 2-3	Clear CMOS Setup

Table 4-4: Clear BIOS Jumper Settings

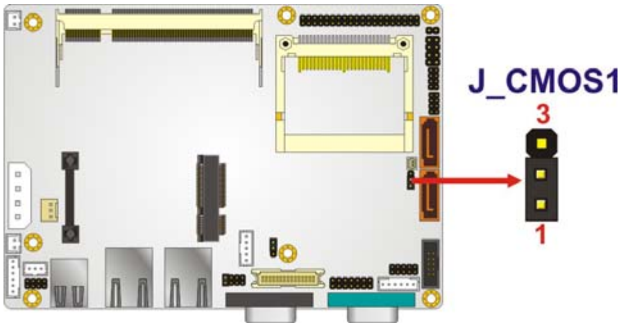


Figure 4-5: Clear BIOS Jumper Location

4.4.4 COM 2 Function Select Jumper

Jumper Label: **JP1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-5**

Jumper Location: See **Figure 4-6**

The COM 2 Function Select jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485.

Setting	Description
Short 1-2	RS-232 (Default)
Short 3-4	RS-422
Short 5-6	RS-485
Short 5-6 Short 7-8	RS-485 with RTS control

Table 4-5: COM 2 Function Select Jumper Settings

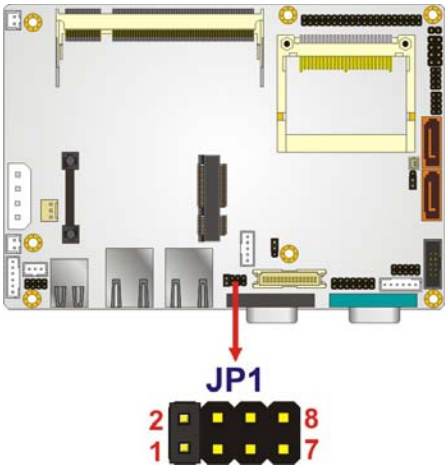


Figure 4-6: COM 2 Function Select Jumper Location

4.4.5 LVDS1 Panel Resolution Jumper

Jumper Label: **J_LCD_TYPE1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-6**

Jumper Location: See **Figure 4-7**

The LVDS1 Panel Resolution jumper allows the resolution of the LVDS screens connected to the LVDS1 connector to be configured.

J_LCD_TYPE1				Description
Pin 7- Pin 8	Pin 5- Pin 6	Pin 3- Pin 4	Pin 1-Pin 2	
OFF	OFF	OFF	OFF	640 x 480 18-bit
OFF	OFF	OFF	ON	800 x 480 18-bit
OFF	OFF	ON	OFF	800 x 600 18-bit (Default)
OFF	OFF	ON	ON	1024 x 768 18-bit
OFF	ON	OFF	OFF	1280 x 1024 36-bit
OFF	ON	OFF	ON	1400 x 1050 36-bit
OFF	ON	ON	OFF	1400 x 900 36-bit
OFF	ON	ON	ON	1600 x 1200 36-bit

Table 4-6: LVDS Panel Resolution Jumper Settings

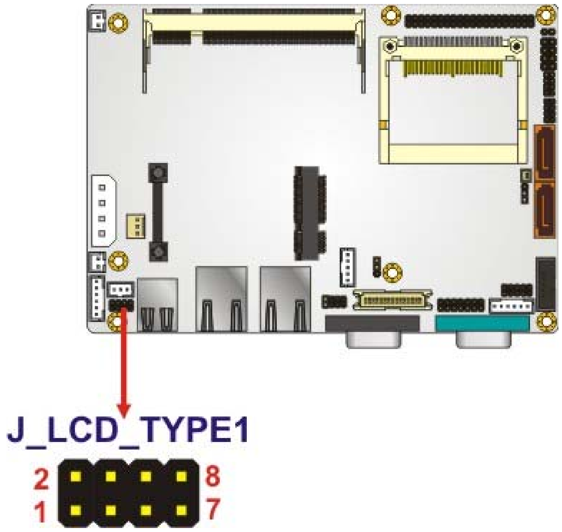


Figure 4-7: LVDS Panel Resolution Jumper Pinout Locations

4.4.6 LVDS Voltage Selection

WARNING:

Permanent damage to the screen and WAFER-945GSE may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

Jumper Label: **J_VLVDS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-7**

Jumper Location: See **Figure 4-8**

The LVDS Voltage Selection jumpers allow the LVDS screen voltages to be set.

Setting	Description
Short 1-2	+3.3V LVDS (Default)
Short 2-3	+5V LVDS

Table 4-7: LVDS Voltage Selection Jumper Settings

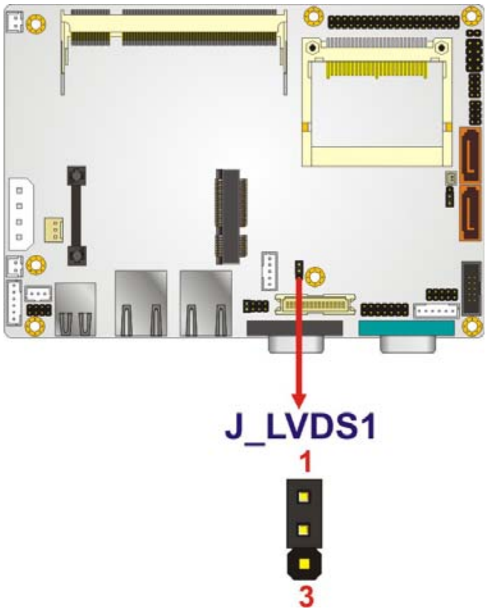


Figure 4-8: LVDS Voltage Selection Jumper Pinout Locations

4.5 Chassis Installation

4.5.1 Heat Sink Enclosure

WARNING:

Never run the WAFER-945GSE without the heat sink secured to the board. The heat sink ensures the system remains cool and does not need addition heat sinks to cool the system.

WARNING:

When running the WAFER-945GSE, do not put the WAFER-945GSE directly on a surface that can not dissipate system heat, especially the wooden or plastic desk. It is highly recommended to run the WAFER-945GSE

→ on a heat dissipation surface or

→ using copper pillars to hold the board up from the desk below

When the WAFER-945GSE is shipped it is secured to a heat sink with five retention screws. If the WAFER-945GSE must be removed from the heat sink, the five retention screws must be removed.

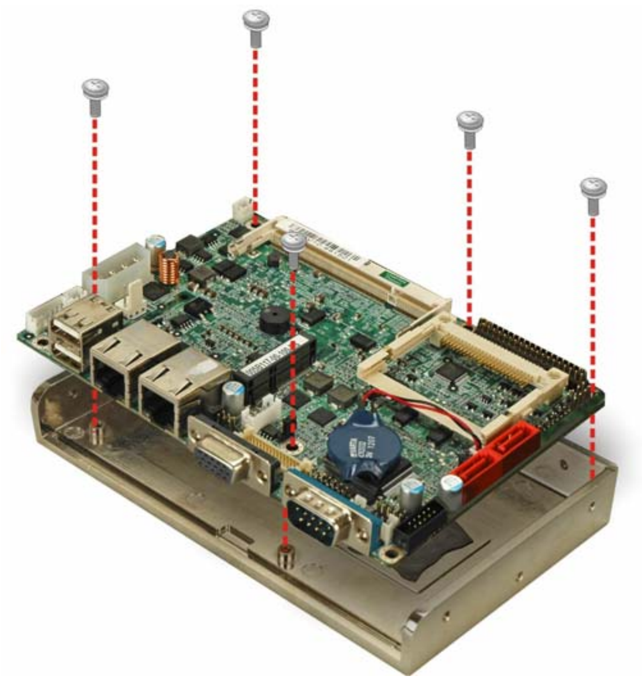


Figure 4-9: Heat Sink Retention Screws

4.5.2 Motherboard Installation

Each side of the heat sink enclosure has several screw holes allowing the WAFER-945GSE to be mounted into a chassis (please refer to **Figure 1-3** and **Figure 1-4** for the detailed dimensions). The user can design or select a chassis that has screw holes matching up with the holes on the heat sink enclosure for installing the WAFER-945GSE. The following diagram shows an example of motherboard installation.

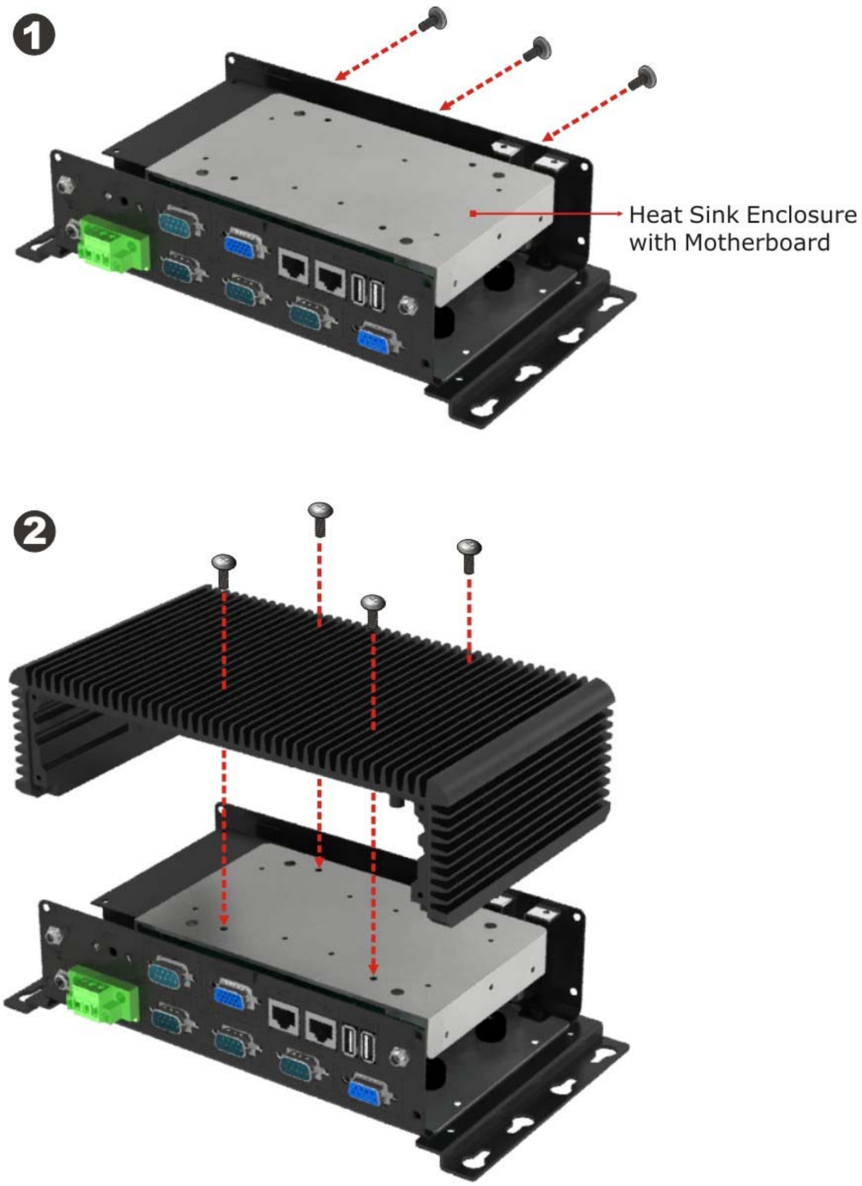


Figure 4-10: Motherboard Installation Example

4.6 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.6.1 SATA Drive Connection

The WAFER-945GSE is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector until it clips into place. See **Figure 4-11**.

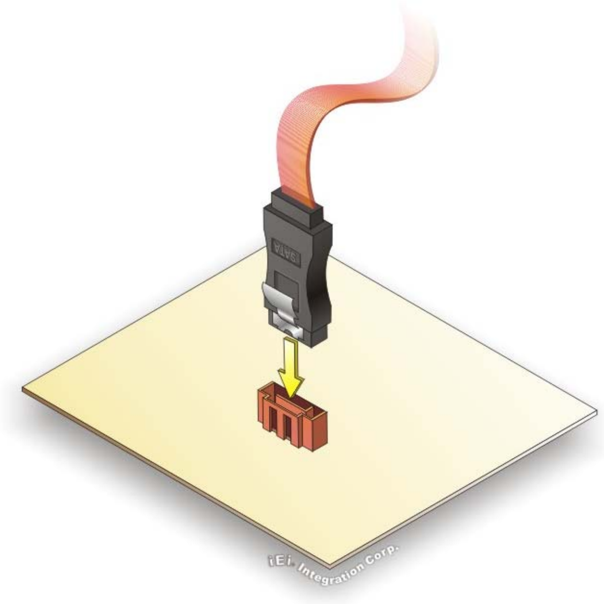


Figure 4-11: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-12**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-12**.

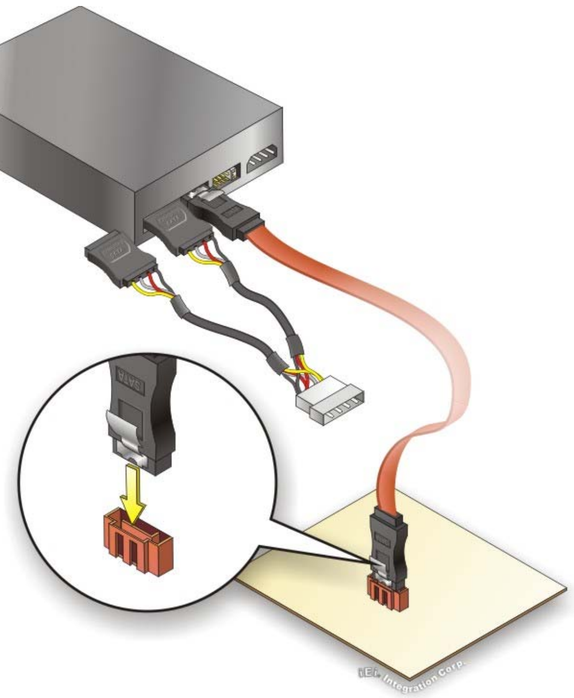


Figure 4-12: SATA Power Cable Connection

The SATA power cable can be bought from IEI. See Optional Items in Section 2.4.

4.6.2 Serial Port Connector Cable (Four Ports) Cable Connection

The WAFER-945GSE is shipped with one four serial port connector cable. The four serial port connector cable connects four serial port connectors on the cable to the 40-pin serial port connector on the WAFER-945GSE. To connect the four serial port connector cable, please follow the steps below.

Step 1: **Locate the serial port connector**. The location of the 40-pin serial port connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the WAFER-945GSE 40-pin serial port connector. See **Figure 4-13**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 40-pin serial port connector on the WAFER-945GSE, connect the cable connector to the on-board connectors. See **Figure 4-13**.

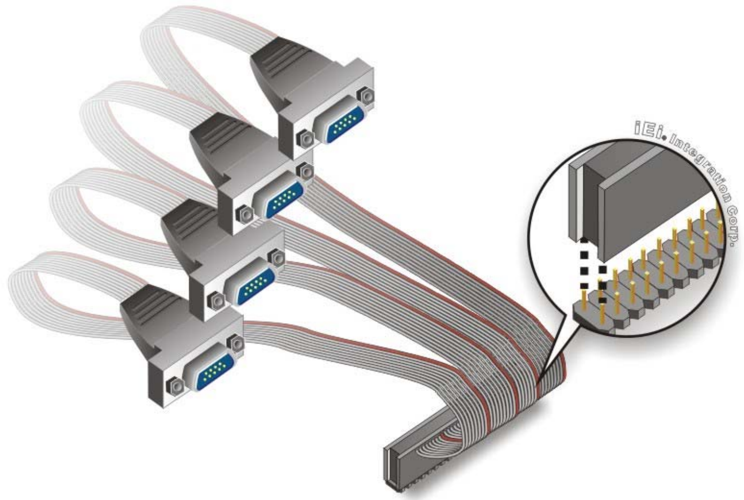


Figure 4-13: Four Serial Port Connector Cable Connection

Step 4: **Attach DB-9 serial port connectors to the chassis**. The four DB-9 serial port connectors can be inserted into four preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with the retention screws.

4.6.3 Dual RS-232 Cable Connection (w/o bracket) (Optional)

The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9-pin male connector. To install the dual RS-232 cable, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connectors.** Insert one connector into each serial port box headers. See **Figure 4-14**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

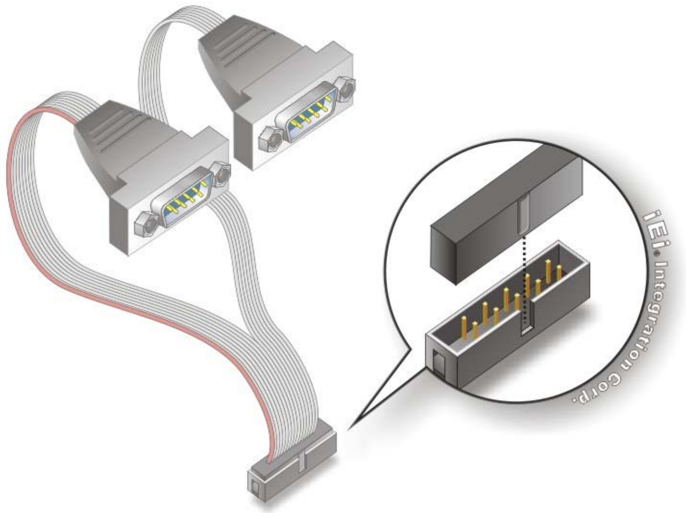


Figure 4-14: Dual RS-232 Cable Installation

Step 3: **Secure the connectors**. Both single RS-232 connectors have two retention screws that must be secured to a chassis or bracket.

Step 4: **Connect the serial device**. Once the single RS-232 connectors are connected to a chassis or bracket, a serial communications device can be connected to the system.

4.6.4 4-COM Port Adapter Board Connection (Optional)

An optional, separately purchased 4-COM port adapter board may be shipped with the WAFER-945GSE. To install the 4-COM Port Adapter Board, please follow the steps below.

Step 1: **Locate the COM connector**. The locations of the COM port connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector.** Align the cable connector with the onboard connector. Make sure the pin 1on the cable connector is properly aligned with pin 1 on the board connector (**Figure 4-15**).

Step 3: **Connect the adapter board to the cable.** The adapter board with the four COM ports must then be attached to the cable. Make sure the cable connector is

properly aligned with the connector on the adapter board. Make sure the pin 1 on the adapter board connector and the cable connector are aligned. See **Figure 4-15**.

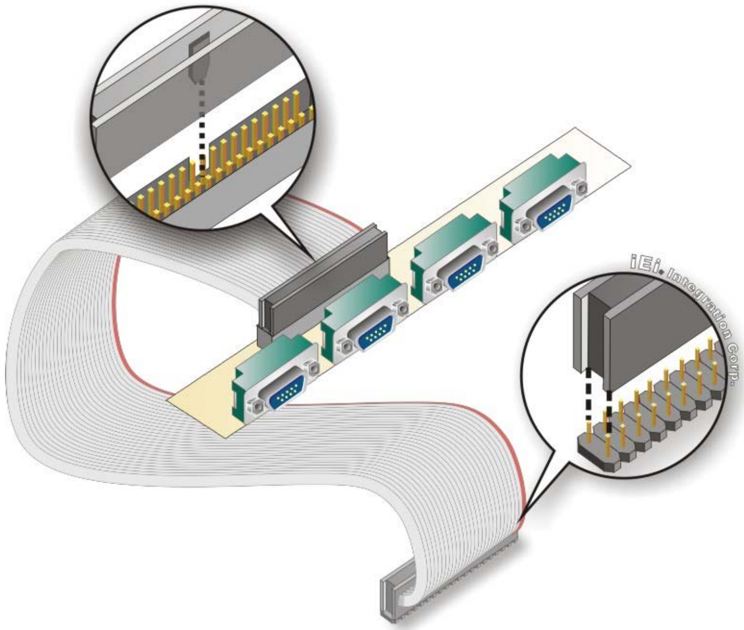


Figure 4-15: 4-COM Port Adapter Board

Step 4: **Secure the adapter board to the chassis**. Make sure the retention screws on either side of each COM port DB-9 connector are firmly secured to the chassis enclosure.

Step 5: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-16**.

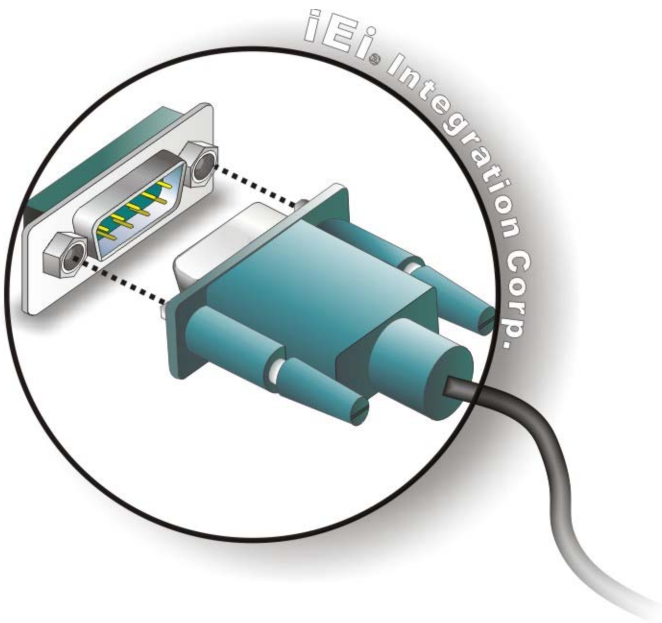


Figure 4-16: Serial Device Connector

4.6.5 Keyboard/Mouse Y-cable Connector

The WAFER-945GSE is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the WAFER-945GSE and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector, please follow the steps below.

Step 1: **Locate the connector**. The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the WAFER-945GSE keyboard/mouse connector. See **Figure 4-17**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the WAFER-945GSE, connect the cable connector to the on-board connectors. See **Figure 4-17**.

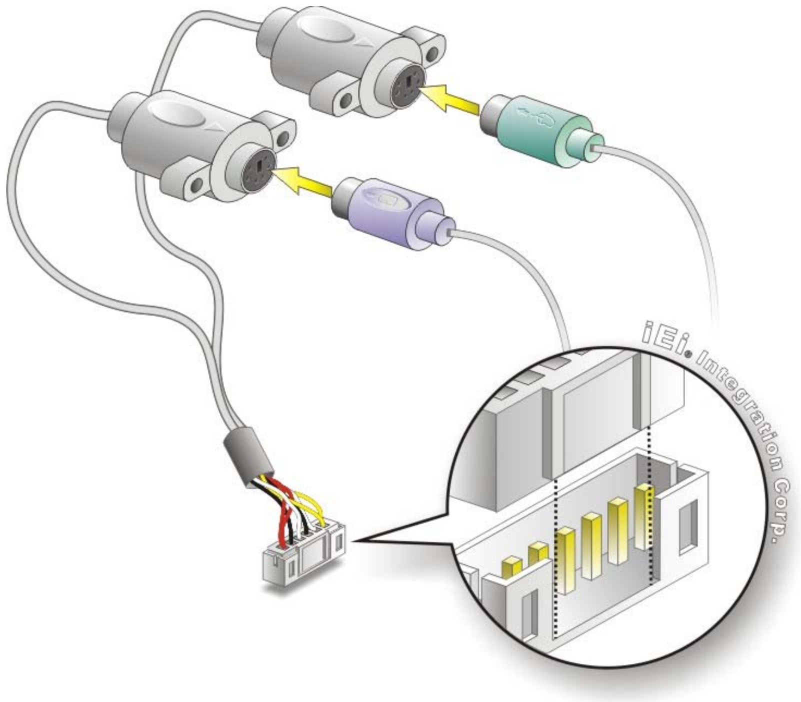


Figure 4-17: Keyboard/mouse Y-cable Connection

Step 4: **Attach PS/2 connectors to the chassis**. The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect the keyboard and mouse**. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

4.6.6 Audio Kit Installation

The Audio Kit that came with the WAFER-945GSE connects to the 10-pin audio connector on the WAFER-945GSE. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 4-18**.

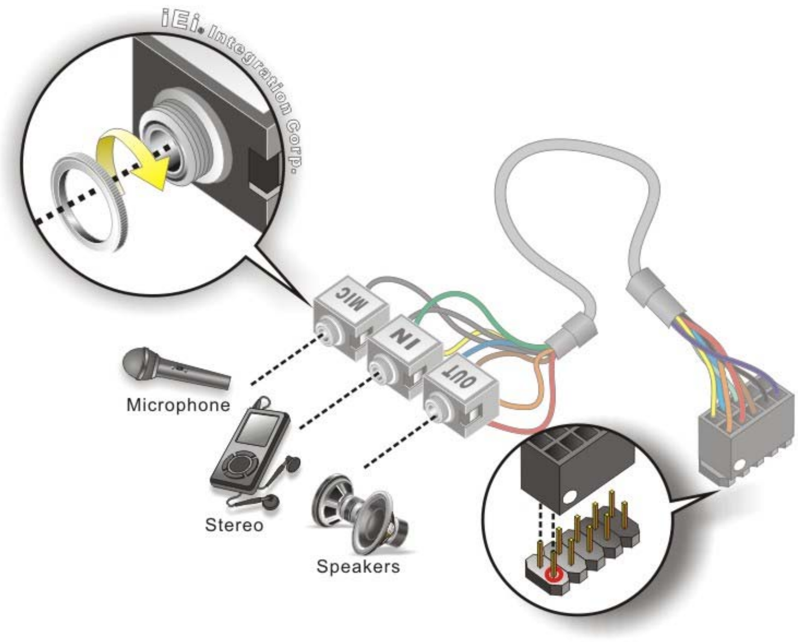


Figure 4-18: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

4.6.7 USB Cable (Dual Port without Bracket) (Optional)

The WAFER-945GSE is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the WAFER-945GSE USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the WAFER-945GSE, connect the cable connectors to the on-board connectors. See **Figure 4-19**.

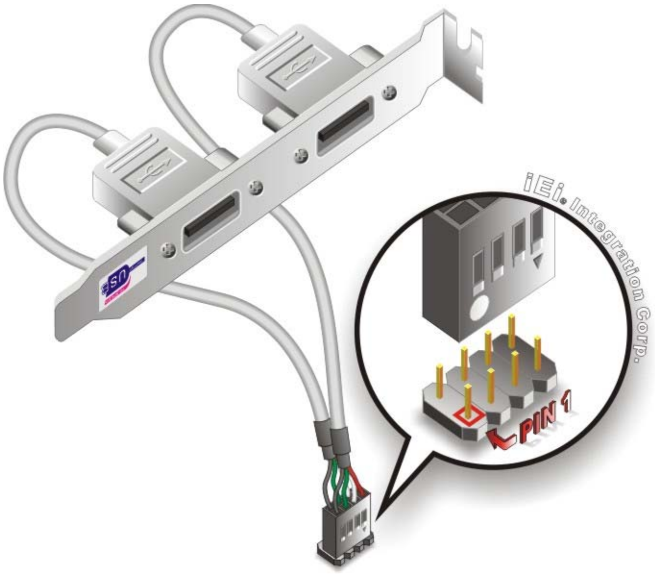


Figure 4-19: Dual USB Cable Connection

Step 4: **Attach the USB connectors to the chassis**. The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

5.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press DEL to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side

Key	Function
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2/F3 key	Change color from total 3 colors. F2 to select color forward
F10	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **4**.

5.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- PCIPnP – Changes the advanced PCI/PnP settings
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Chipset – Changes the chipset settings.
- Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.

```
                          BIOS SETUP UTILITY
   Main   Advanced   PCIPnP     Boot    Security  Chipset     Exit

System Overview                                    Use [ENTER], [TAB] or
                                                   [SHIFT-TAB] to select a
AMIBIOS                                            field.
Version     :08.00.15
Build Date :07/07/11                               Use [+] or [-] to
ID:         :B210MR01                              configure system time.

Processor
Genuine Intel(R) CPU N270  @ 1.60GHz
Speed        :1600MHz
Count        :1                                    ←→    Select Screen
                                                   ↑ ↓   Select Item
System Memory                                      + -   Change Field
Size          :504MB                               Tab   Select Field
                                                   F1    General Help
System Time                    [14:20:27]          F10   Save and Exit
System Date                    [Tue 08/30/2011]    ESC   Exit

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```

BIOS Menu 1: Main

➔ **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - Version: Current BIOS version
  - Build Date: Date the current BIOS version was made
  - ID: Installed BIOS ID
- **Processor**: Displays auto-detected CPU specifications
  - Type: Names the currently installed processor
  - Speed: Lists the processor speed
  - Count: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - Size: Lists memory size

The System Overview field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

```
                          BIOS SETUP UTILITY
  Main    Advanced   PCIPnP     Boot     Security   Chipset     Exit

 Advanced Settings                                      Configure CPU
 ____________________________________________________
 WARNING: Setting wrong values in below sections may
          cause system to malfunction.

 > CPU Configuration
 > IDE Configuration
 > SuperIO Configuration                                ←→    Select Screen
 > Hardware Health Configuration                        ↑ ↓   Select Item
 > Power Configuration                                  Enter Go to Sub Screen
 > Remote Access Configuration                          F1    General Help
 > USB Configuration                                    F10   Save and Exit
                                                        ESC   Exit

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```

BIOS Menu 2: Advanced

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

5.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.

```
                          BIOS SETUP UTILITY
          Advanced
Configure advanced CPU Settings
Module Version:3F.10
____________________________________________________
Manufacturer  :Intel
Genuine Intel(R) CPU N270 @ 1.60GHz
Frequency     :1.60GHz
FSB Speed     :532Hz
                                                        ←→   Select Screen
Cache L1      :24 KB                                    ↑ ↓  Select Item
Cache L2      :512 KB                                   F1   General Help
                                                        F10  Save and Exit
Ratio Actual Value:12                                   ESC  Exit

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```

BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Brand String**: Lists the brand name of the CPU being used
- **Frequency**: Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- **Ratio Actual Value**: Lists the ratio of the frequency to the clock speed

5.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.

```
                         BIOS SETUP UTILITY
          Advanced
IDE Configuration                                   | Options
____________________________________________________|
ATA/IDE Configuration            [Compatible]       | Disabled
  Legacy IDE Channels            [SATA Pri, PATA Sec]| Compatible
                                                    | Enhanced
> Primary IDE Master             : [Not Detected]   |
> Primary IDE Slave              : [Not Detected]   |
> Secondary IDE Master           : [Not Detected]   | ←→    Select Screen
> Secondary IDE Slave            : [Not Detected]   | ↑ ↓   Select Item
                                                    | + -   Change Option
                                                    | F1    General Help
                                                    | F10   Save and Exit
                                                    | ESC   Exit
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```

BIOS Menu 4: IDE Configuration

➔ ATA/IDE Configuration [Compatible]

Use the **ATA/IDE Configuration** option to configure the ATA/IDE controller.

- ➔ **Disabled** — Disables the on-board ATA/IDE controller.
- ➔ **Compatible** DEFAULT — Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.
- ➔ **Enhanced** — Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

➔ Legacy IDE Channels [SATA Pri, PATA Sec]

- ➔ **SATA Only** — Only the SATA drives are enabled.
- ➔ **SATA Pri, PATA Sec** DEFAULT — The SATA drives are enabled on the Primary IDE channel. The IDE drives are enabled on the Secondary IDE channel.

- **PATA Only** — The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

IDE Master and IDE Slave

When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options is selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

5.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.

```
BIOS SETUP UTILITY
Advanced

Primary IDE Master                            Select the type of device
                                              connected to the system.
Device        :Not Detected

Type                            [Auto]
LBA/Large Mode                  [Auto]
Block (Multi-Sector Transfer)   [Auto]
PIO Mode                        [Auto]        ←→    Select Screen
DMA Mode                        [Auto]        ↑ ↓   Select Item
S.M.A.R.T.                      [Auto]        + -   Change Option
32Bit Data Transfer             [Enabled]     F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

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```

BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ Auto-Detected Drive Parameters

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ Type [Auto]

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM

drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

- **ARMD** — This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

  ZIP

  LS-120

→ LBA/Large Mode [Auto]

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

- **Disabled** — BIOS is prevented from using the LBA mode control on the specified channel.
- **Auto** DEFAULT — BIOS auto detects the LBA mode control on the specified channel.

→ Block (Multi Sector Transfer) [Auto]

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

- **Disabled** — BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
- **Auto** DEFAULT — BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto** DEFAULT — BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

➔ **0** — PIO mode 0 selected with a maximum transfer rate of 3.3MBps

➔ **1** — PIO mode 1 selected with a maximum transfer rate of 5.2MBps

➔ **2** — PIO mode 2 selected with a maximum transfer rate of 8.3MBps

➔ **3** — PIO mode 3 selected with a maximum transfer rate of 11.1MBps

➔ **4** — PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔ **Auto** DEFAULT — BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.

➔ **SWDMA0** — Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps

➔ **SWDMA1** — Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps

➔ **SWDMA2** — Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps

➔ **MWDMA0** — Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps

➔ **MWDMA1** — Multi Word DMA mode 1 selected with a maximum data

transfer rate of 13.3MBps

- ➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- ➔ **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- ➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ S.M.A.R.T [Auto]

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

- ➔ **Auto** DEFAULT BIOS auto detects HDD SMART support.
- ➔ **Disabled** Prevents BIOS from using the HDD SMART feature.
- ➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ 32Bit Data Transfer [Enabled]

Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

- → **Disabled** Prevents the BIOS from using 32-bit data transfers.
- → **Enabled DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

5.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the serial ports.

```
                         BIOS SETUP UTILITY
          Advanced
 Configure ITE8718 Super IO Chipset              | Allows BIOS to select
 ______________________________________________  | Serial Port1 Base
 Serial Port1 Address          [3F8/IRQ4]        | Addresses
 Serial Port2 Address          [2F8/IRQ3]        |
 Serial Port3 Address          [3E8]             |
   Serial Port3 IRQ            [11]              |
 Serial Port4 Address          [2E8]             |
   Serial Port4 IRQ            [11]              | ←→    Select Screen
 Serial Port5 Address          [2F0]             | ↑↓    Select Item
   Serial Port5 IRQ            [11]              | + -   Change Option
 Serial Port6 Address          [2E0]             | F1    General Help
   Serial Port6 IRQ            [11]              | F10   Save and Exit
                                                 | ESC   Exit
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```

BIOS Menu 6: Super IO Configuration

→ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

- → **Disabled** No base address is assigned to Serial Port 1
- → **3F8/IRQ4 DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- → **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- → **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled** No base address is assigned to Serial Port 2

➔ **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

➔ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base address for serial port 3

➔ **Disabled** No base address is assigned to serial port 3

➔ **3E8** **DEFAULT** Serial port 3 I/O port address is 3E8

➔ **2E8** Serial port 3 I/O port address is 2E8

➔ **2F0** Serial port 3 I/O port address is 2F0

➔ **2E0** Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [11]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **10** Serial port 3 IRQ address is 10

➔ **11** **DEFAULT** Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the base address for serial port 4.

➔ **Disabled** No base address is assigned to serial port 3

- ➔ **3E8** Serial port 4 I/O port address is 3E8
- ➔ **2E8** DEFAULT Serial port 4 I/O port address is 2E8
- ➔ **2F0** Serial port 4 I/O port address is 2F0
- ➔ **2E0** Serial port 4 I/O port address is 2E0

➔ **Serial Port4 IRQ [11]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

- ➔ **10** Serial port 4 IRQ address is 10
- ➔ **11** DEFAULT Serial port 4 IRQ address is 11

➔ **Serial Port5 Address [2F0]**

Use the **Serial Port5 Address** option to select the base address for serial port 5

- ➔ **Disabled** No base address is assigned to serial port 5
- ➔ **3E8** Serial port 5 I/O port address is 3F8
- ➔ **2E8** Serial port 5 I/O port address is 2E8
- ➔ **2F0** DEFAULT Serial port 5 I/O port address is 2F0
- ➔ **2E0** Serial port 5 I/O port address is 2E0

➔ **Serial Port5 IRQ [11]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

- ➔ **10** Serial port 5 IRQ address is 10
- ➔ **11** DEFAULT Serial port 5 IRQ address is 11

➔ **Serial Port6 Address [2E0]**

Use the **Serial Port6 IRQ** option to select the base address for serial port 6.

- **Disabled** No base address is assigned to serial port 6
- **3E8** Serial port 6 I/O port address is 3E8
- **2E8** Serial port 6 I/O port address is 2E8
- **2F0** Serial port 6 I/O port address is 2F0
- **2E0** **DEFAULT** Serial port 6 I/O port address is 2E0

Serial Port6 IRQ [11]

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

- **10** Serial port 6 IRQ address is 10
- **11** **DEFAULT** Serial port 6 IRQ address is 11

5.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.

```
                         BIOS SETUP UTILITY
          Advanced
 Hardware Health Configuration                     Fan configuration mode
 ____________________________________________      setting
 CPU FAN Mode Setting             [Full On Mode]
 ____________________________________________
 CPU Temperature                 :43ºC/109ºF
 System Temperature              :33ºC/91ºF

 CPU Fan Speed                   :N/A

 CPU Core                        :1.136 V
 +1.05V                          :1.040 V          ←→   Select Screen
 +3.30V                          :3.296 V          ↑ ↓  Select Item
 +5.00V                          :4.972 V          + -  Change Option
 +12.0V                          :12.288 V         F1   General Help
 +1.5V                           :1.477 V          F10  Save and Exit
 +1.8V                           :1.792 V          ESC  Exit
 5VSB                            :5.053 V
 VBAT                            :3.184 V

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```

BIOS Menu 7: Hardware Health Configuration

→ **CPU FAN Mode Setting [Full On Mode]**

Use the **CPU FAN Mode Setting** option to configure the second fan.

→ **Full On Mode** DEFAULT Fan is on all the time

→ **Automatic mode** Fan is off when the temperature is low enough. Parameters must be set by the user.

→ **PWM Manually mode** Pulse width modulation set manually

When the **CPU FAN Mode Setting** option is in the **Automatic Mode**, the following parameters can be set.

- CPU Temperature Limit of Off
- CPU Temperature Limit of On
- CPU Fan Start PWM
- Slope PWM

When the **CPU FAN Mode Setting** option is in the **PWM Manually Mode**, the following parameters can be set.

- CPU Fan PWM control

→ **CPU Temperature Limit of Off [000]**

WARNING:

Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temperature Limit of Off** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temperature Limit of Off** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temperature Limit of Off** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

➔ **CPU Temperature Limit of On [020]**

WARNING:

Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temperature Limit of On** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temperature Limit of On** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **CPU Fan Start PWM** option below. To select a value, select the **CPU Temperature Limit of On** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

➔ **CPU Fan Start PWM [070]**

The **CPU Fan Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Fan Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **CPU Temperature Limit of On** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **CPU Fan Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

➔ **Slope PWM [0.5 PWM]**

The **Slope PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. A list of available options is shown below:

- 0.125 PWM
- 0.25 PWM
- 0.5 PWM
- 1 PWM
- 2 PWM
- 4 PWM
- 8 PWM
- 15 PWM

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
  - System Temperature
- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - CPU Fan Speed
- **Voltages**: The following system voltages are monitored
  - CPU Core
  - +1.05V
  - +3.30V
  - +5.00V
  - +12.0 V
  - +1.5V
  - +1.8V
  - 5VSB
  - VBAT

5.3.5 Power Configuration

The **Power Configuration** menu (**BIOS Menu 8**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.

```
                              BIOS SETUP UTILITY
          Advanced
Select AT/ATX Power                [BY HARDWARE]       Default set AUTO is
Auto Power Button Status           [Enabled]           detect power supply
                                                       status.

                                                       If set AT Power, Power
                                                       State will Auto set Power
                                                       On.


                                                       ←→   Select Screen
                                                       ↑ ↓  Select Item
                                                       + -  Change Option
                                                       F1   General Help
                                                       F10  Save and Exit
                                                       ESC  Exit
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```

BIOS Menu 8: Power Configuration

➔ **Select AT/ATX Power [By HARDWARE]**

Sets the behavior of the power.

- AT Power
- ATX Power
- BY HARDWARE **DEFAULT**

When the **Select AT/ATX Power** option is set to **ATX Power**, the following sub-menus appear.

- ACPI Configuration
- APM Configuration

5.3.5.1 ACPI configuration

The **ACPI Configuration** menu (**BIOS Menu 9**) configures the Advanced Configuration and Power Interface (ACPI).

```
                         BIOS SETUP UTILITY
          Advanced
 ACPI Settings                                  Select the ACPI state
 ------------------------------------------     used for System Suspend.
 Suspend mode                 [S1 (POS)]

                                                ←→    Select Screen
                                                ↑ ↓   Select Item
                                                + -   Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit
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```

BIOS Menu 9: ACPI Configuration

➔ **Suspend mode [S1 (POS)]**

Use the **Suspend mode** BIOS option to specify the sleep state the system enters when it is not being used.

➔ **S1 (POS)** **DEFAULT** System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **S3 (STR)** System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

5.3.5.2 APM Configuration

The **APM Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.

```
                        BIOS SETUP UTILITY
          Advanced
APM Configuration                                  Options
_________________________________________
Restore on AC Power Loss        [Last State]       Power Off
Power Button Mode               [On/Off]           Power On
                                                   Last State
Advanced Resume Event Controls
  Resume On Keyboard/Mouse      [Disabled]
  Resume On Ring                [Disabled]
  Resume On PCI-Express WAKE#   [Enabled]
  Resume On RTC Alarm           [Disabled]         ←→   Select Screen
                                                   ↑ ↓  Select Item
                                                   + -  Change Option
                                                   F1   General Help
                                                   F10  Save and Exit
                                                   ESC  Exit
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```

BIOS Menu 10: Advanced Power Management Configuration

➔ Restore on AC Power Loss [Last State]

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

- ➔ **Power Off** — The system remains turned off
- ➔ **Power On** — The system turns on
- ➔ **Last State** **DEFAULT** — The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ Power Button Mode [On/Off]

Use the **Power Button Mode** BIOS to specify how the power button functions.

- ➔ **On/Off** **DEFAULT** — When the power button is pressed the system is either turned on or off
- ➔ **Suspend** — When the power button is pressed the system goes into suspend mode

➔ Resume on Keyboard/Mouse [Disabled]

Use the **Resume on Keyboard/Mouse** BIOS option to enable activity on either the keyboard or mouse to rouse the system from a suspend or standby state. That is, the system is roused when the mouse is moved or a button on the keyboard is pressed.

- ➔ **Disabled** DEFAULT Wake event not generated by activity on the keyboard or mouse
- ➔ **Enabled** Wake event generated by activity on the keyboard or mouse

➔ **Resume on Ring [Disabled]**

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

- ➔ **Disabled** DEFAULT Wake event not generated by an incoming call
- ➔ **Enabled** Wake event generated by an incoming call

➔ **Resume on PCI-Express WAKE# [Enabled]**

Use the **Resume PCI-Express WAKE#** BIOS option to enable activity on the PCI-Express WAKE# signal to rouse the system from a suspend or standby state.

- ➔ **Disabled** Wake event not generated by PCI-Express WAKE# signal activity
- ➔ **Enabled** DEFAULT Wake event generated by PCI-Express WAKE# signal activity

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** option to specify the time the system should be roused from a suspended state.

- ➔ **Disabled** DEFAULT The real time clock (RTC) cannot generate a wake event

- ➔ **Enabled** If selected, the following appears with values that can be selected:

  RTC Alarm Date (Days)

  System Time

  After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.6 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 11**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.

```
                              BIOS SETUP UTILITY
          Advanced
Configure Remote Access type and parameters     | Select Remote Access
________________________________________________| type.
Remote Access                  [Disabled]       |
                                                |
                                                | ←→   Select Screen
                                                | ↑ ↓  Select Item
                                                | + -  Change Option
                                                | F1   General Help
                                                | F10  Save and Exit
                                                | ESC  Exit
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```

BIOS Menu 11: Remote Access Configuration

➔ Remote Access [Disabled]

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

- ➔ **Disabled** **DEFAULT** Remote access is disabled.
- ➔ **Enabled** Remote access configuration options shown below

appear:

- Serial port number
- Serial Port Mode
- Redirection after BIOS POST
- Terminal Type

These configuration options are discussed below.

→ **Serial Port Number [COM1]**

Use the **Serial Port Number** option to select the serial port used for remote access.

→ **COM1** DEFAULT System is remotely accessed through COM1

→ **COM2** System is remotely accessed through COM2

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

→ **Base Address, IRQ [3F8h,4]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

→ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 DEFAULT
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting must be set on the host (a management computer running a terminal software) and the slave

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled**		The console is not redirected after POST
➔ **Boot Loader**		Redirection is active during POST and during Boot Loader
➔ **Always**	**DEFAULT**	Redirection is always active (Some OSes may not work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI
➔ **VT100**		The target terminal type is VT100
➔ **VT-UTF8**		The target terminal type is VT-UTF8

5.3.7 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 12**) to read USB configuration information and configure the USB settings.

```
                           BIOS SETUP UTILITY
  Main    Advanced   PCIPnP    Boot    Security  Chipset    Exit

USB Configuration                                   Options
__________________________________________________
Module Version – 2.24.3-13.4                        Disabled
                                                    Enabled
USB Devices Enabled:
           None
                                                    ←→   Select Screen
USB Function                      [Enabled]         ↑ ↓  Select Item
USB 2.0 Controller                [Enabled]         + -  Change Option
Legacy USB Support                [Enabled]         F1   General Help
USB 2.0 Controller Mode           [HiSpeed]         F10  Save and Exit
                                                    ESC  Exit

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```

BIOS Menu 12: USB Configuration

➔ USB Function [Enabled]

Use the **USB Function** option to enable or disable the USB controllers.

- ➔ **Disabled** — USB controllers are enabled
- ➔ **Enabled** — **DEFAULT** — USB controllers are disabled

➔ USB 2.0 Controller [Enabled]

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

- ➔ **Disabled** — USB function disabled
- ➔ **Enabled** — **DEFAULT** — USB function enabled

➔ Legacy USB Support [Enabled]

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- ➔ **Disabled** Legacy USB support disabled
- ➔ **Enabled** **DEFAULT** Legacy USB support enabled
- ➔ **Auto** Legacy USB support disabled if no USB devices are connected

➔ **USB 2.0 Controller Mode [HiSpeed]**

The **USB2.0 Controller Mode** BIOS option sets the speed of the USB2.0 controller.

- ➔ **FullSpeed** The controller is capable of operating at full speed 12 Mb/s
- ➔ **HiSpeed** **DEFAULT** The controller is capable of operating at high speed 480 Mb/s

5.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 13**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

```
                              BIOS SETUP UTILITY
 Main    Advanced   PCIPnP    Boot    Security  Chipset    Exit

Advanced PCI/PnP Settings                          | Available: Specified
____________________________________________________| IRQ is available to be
WARNING: Setting wrong values in below sections    | used by PCI/PnP
         may cause system to malfunction.          | devices
                                                   | Reserved: Specified
IRQ3                             [Reserved]        | IRQ is reserved for
IRQ4                             [Reserved]        | use by legacy ISA
IRQ5                             [Available]       | devices
IRQ7                             [Available]       |
IRQ9                             [Available]       |
IRQ10                            [Available]       |
IRQ11                            [Reserved]        |
IRQ14                            [Available]       |
IRQ15                            [Available]       |
                                                   |
DMA Channel 0                    [Available]       | ←→    Select Screen
DMA Channel 1                    [Available]       | ↑ ↓   Select Item
DMA Channel 3                    [Available]       | + -   Change Option
DMA Channel 5                    [Available]       | F1    General Help
DMA Channel 6                    [Available]       | F10   Save and Exit
DMA Channel 7                    [Available]       | ESC   Exit
                                                   |
Reserved Memory Size             [Disabled]        |
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```

BIOS Menu 13: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7

- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

→ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

→ **Available**	**DEFAULT**	The specified DMA is available to be used by PCI/PnP devices
→ **Reserved**		The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

→ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

→ **Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
→ **16K**		16KB reserved for legacy ISA devices
→ **32K**		32KB reserved for legacy ISA devices
→ **64K**		54KB reserved for legacy ISA devices

5.5 Boot

Use the **Boot menu** (**BIOS Menu 14**) to configure system boot options.

```
                                BIOS SETUP UTILITY
   Main    Advanced    PCIPnP       Boot     Security   Chipset     Exit

 Boot Settings                                     | Configure settings
 ------------------------------------------------- | during system boot.
 > Boot Settings Configuration                     |
                                                   |
 > Boot Device Priority                            |
 > Hard Disk Drives                                |
                                                   | ←→    Select Screen
                                                   | ↑↓    Select Item
                                                   | Enter Go to Sub Screen
                                                   | F1    General Help
                                                   | F10   Save and Exit
                                                   | ESC   Exit
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```

BIOS Menu 14: Boot

5.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 15**) to configure advanced system boot options.

```
                                BIOS SETUP UTILITY
                                    Boot

 Boot Settings Configuration                       | Allows BIOS to skip
 ------------------------------------------------- | certain tests while
 Quick Boot                      [Enabled]         | booting. This will
 Quiet Boot                      [Enabled]         | decrease the time needed
 AddOn ROM Display Mode          [Force BIOS]      | to boot the system.
 Bootup Num-Lock                 [On]              |
 Boot From LAN Support           [Disabled]        |
 Spread Spectrum Function        [Disabled]        | ←→    Select Screen
                                                   | ↑↓    Select Item
                                                   | Enter Go to SubScreen
                                                   | F1    General Help
                                                   | F10   Save and Exit
                                                   | ESC   Exit
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```

BIOS Menu 15: Boot Settings Configuration

→ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

→ **Disabled** No POST procedures are skipped

→ **Enabled** **DEFAULT** Some POST procedures are skipped to decrease the system boot time

→ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

→ **Disabled** Normal POST messages displayed

→ **Enabled** **DEFAULT** OEM Logo displayed instead of POST messages

→ **AddOn ROM Display Mode [Force BIOS]**

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

→ **Force BIOS** **DEFAULT** Allows the computer system to force a third party BIOS to display during system boot.

→ **Keep Current** Allows the computer system to display the information during system boot.

→ **Bootup Num-Lock [On]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

→ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

→ **On** **DEFAULT** Allows the Number Lock on the keyboard to be enabled

automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Boot From LAN Support [Disabled]**

The **Boot From LAN Support** option enables the system to be booted from a remote system.

➔ **Disabled** DEFAULT Cannot be booted from a remote system through the LAN.

➔ **Enabled** Can be booted from a remote system through the LAN.

➔ **Spread Spectrum Function [Disabled]**

Use the **Spread Spectrum Function** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

➔ **Disabled** DEFAULT EMI not reduced

➔ **Enabled** EMI reduced

5.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 16**) to specify the boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.

```
                              BIOS SETUP UTILITY
                                   Boot

 Boot Device Priority                          | Specifies the boot
 ______________________________________________| sequence from the
                                               | available devices.
 1st Boot Device          [USB:Generic Flash]  |
 2nd Boot Device          [CD/DVD:PS-TEAC DV-] | A device enclosed in
 3rd Boot Device          [Network:MBA v9.0.1] | parenthesis has been
                                               | disabled in the
                                               | corresponding type menu.
                                               |
                                               | ←→    Select Screen
                                               | ↑ ↓   Select Item
                                               | + -   Change Option
                                               | F1    General Help
                                               | F10   Save and Exit
                                               | ESC   Exit
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```

BIOS Menu 16: Boot Device Priority Settings

5.6 Security

Use the **Security** menu (**BIOS Menu 17**) to set system and user passwords.

```
                              BIOS SETUP UTILITY
   Main    Advanced   PCIPnP     Boot    Security  Chipset     Exit

 Security Settings                             | Install or Change the
 ______________________________________________| password.
                                               |
 Supervisor Password     :Not Installed        |
 User Password           :Not Installed        |
                                               |
 Change Supervisor Password                    |
 Change User Password                          |
                                               |
                                               | ←→    Select Screen
                                               | ↑ ↓   Select Item
                                               | Enter Change
                                               | F1    General Help
                                               | F10   Save and Exit
                                               | ESC   Exit
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```

BIOS Menu 17: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

5.7 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the NorthBridge and SouthBridge configuration menus.

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
                          BIOS SETUP UTILITY
  Main    Advanced   PCIPnP     Boot    Security   Chipset    Exit

Advanced Chipset Settings                            Configure North Bridge
____________________________________________________ features
WARNING: Setting wrong values in below section
         may cause system to malfunction.

> North Bridge Configuration
> South Bridge Configuration
                                                     ←→    Select Screen
                                                     ↑ ↓   Select Item
                                                     Enter Go to Sub Screen
                                                     F1    General Help
                                                     F10   Save and Exit
                                                     ESC   Exit

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```

BIOS Menu 18: Chipset

5.7.1 North Bridge Chipset Configuration

Use the **North Bridge Chipset Configuration** menu (**BIOS Menu 19**) to configure the Northbridge chipset settings.

```
                          BIOS SETUP UTILITY
                                                  Chipset
 North Bridge Chipset Configuration                     Options
 ____________________________________________________
 Memory Hole                       [Disabled]           Disabled
 Internal Graphics Mode Select     [Enabled, 8MB]       15MB-16MB

 Video Function Configuration
 ____________________________________________________
 DVMT Mode Select                  [DVMT Mode]          ←→    Select Screen
   DVMT/FIXED Memory               [Maximum DVMT]       ↑↓    Select Item
                                                        + -   Change Option
 Boot Display Device               [Auto]               F1    General Help
 LVDS1 Panel Type                  [by H/W]             F10   Save and Exit
 LVDS1 Current Jumper Setting      [8000x600 18b]       ESC   Exit

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```

BIOS Menu 19: North Bridge Chipset Configuration

➔ **Memory Hole [Disabled]**

The **Memory Hole** reserves the memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

- ➔ **Disabled** **DEFAULT** Memory is not reserved for ISA expansion cards
- ➔ **15MB-16MB** Memory is reserved for ISA expansion cards

➔ **Internal Graphics Mode Select [Enabled, 8MB]**

The **Internal Graphic Mode Select** option determines the amount of system memory that can be used by the internal graphics device.

- ➔ **Disabled**
- ➔ **Enabled, 1MB** 1MB of memory used by internal graphics device

→ **Enabled, 8MB** **DEFAULT** 8MB of memory used by internal graphics device

→ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

→ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.

→ **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.

→ **Combo Mode** A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

→ **DVMT/FIXED Memory [Maximum DVMT]**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Selec**t option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128MB. Configuration options are listed below.

- 64MB
- 128MB
- Maximum DVMT **DEFAULT**

→ **Boot Display Device [Auto]**

The **Boot Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- Auto **DEFAULT**
- CRT
- LFP

→ **LVDS1 Panel Type [by H/W]**

Use the **LVDS Panel Type** to determine the LCD panel resolution. Configuration options are listed below:

- 640x480 18b
- 800x480 18b
- 800x600 18b
- 1024x768 18b
- 1280x1024 36b
- 1400x1050 36b
- 1440x900 36b
- 1600x1200 36b
- 1280x720 18b
- by H/W **DEFAULT**

5.7.2 South Bridge Chipset Configuration

The **South Bridge Chipset Configuration** menu (**BIOS Menu 20**) allows the southbridge chipset to be configured.

```
                          BIOS SETUP UTILITY
   Main    Advanced   PCIPnP     Boot    Security   Chipset    Exit

 South Bridge Chipset Configuration                 Options
 ----------------------------------------------------
 Audio Controller                [Enabled]          Enabled
                                                    Disabled

                                                    ←→   Select Screen
                                                    ↑ ↓  Select Item
                                                    + -  Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit
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```

BIOS Menu 20: South Bridge Chipset Configuration

→ **Audio Controller [Enabled]**

The **Audio Controller** option enables or disables the audio controller.

➔	**Enabled**	**DEFAULT**	The on-board audio controller is enabled.
➔	**Disabled**		The on-board audio controller is disabled.

5.8 Exit

Use the **Exit** menu (**BIOS Menu 21**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
                         BIOS SETUP UTILITY
  Main    Advanced   PCIPnP    Boot    Security  Chipset    Exit

Exit Options                                 | Exit system setup after
_____________________________________________| saving the changes.
Save Changes and Exit                        |
Discard Changes and Exit                     | F10 key can be used for
Discard Changes                              | this operation
                                             |
Load Optimal Defaults                        |
Load Failsafe Defaults                       | ←→    Select Screen
                                             | ↑ ↓   Select Item
                                             | Enter Go to Sub Screen
                                             | F1    General Help
                                             | F10   Save and Exit
                                             | ESC   Exit

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```

BIOS Menu 21: Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- VGA
- LAN
- Audio

Installation instructions are given below.

6.2 Starting the Driver Program

To access the driver installation programs, please do the following.

Step 1: Insert the CD that came with the system into a CD drive connected to the system.

NOTE:

If the installation program doesn't start automatically:
Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears.

Step 3: Click WAFER-945GSE.

Step 4: The OS Selection screen appears. Select the operating system installed on the WAFER-945GSE system. This manual describes the installation for a **Windows XP** operating system.

Step 5: The list of drivers appears.

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list shown in **Error! Reference source not found.**. (See **Section 6.2**)

Step 2: Click "**1-Chipset Driver**"

Step 3: The setup files are extracted as shown in **Figure 6-1**.



Figure 6-1: Chipset Driver Screen

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-2** appears.



Figure 6-2: Chipset Driver Welcome Screen

Step 5: Click **Next** to continue.

Step 6: The license agreement in **Figure 6-3** appears.

Step 7: Read the **License Agreement**.

Step 8: Click the **Yes** icon to continue.



Figure 6-3: Chipset Driver License Agreement

Step 9: The Read Me file in **Figure 6-4** appears.

Step 10: Click **Next** to continue.

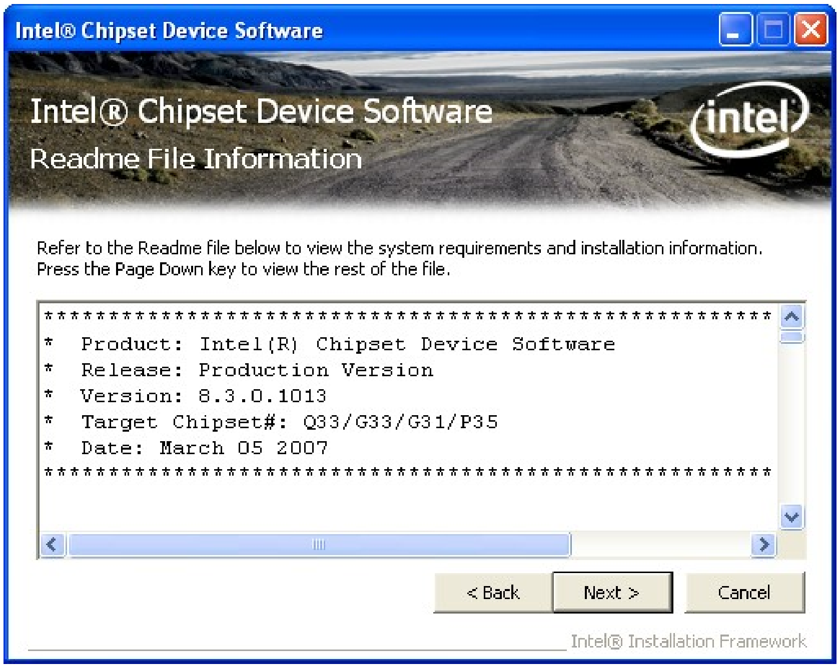


Figure 6-4: Chipset Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-5**.

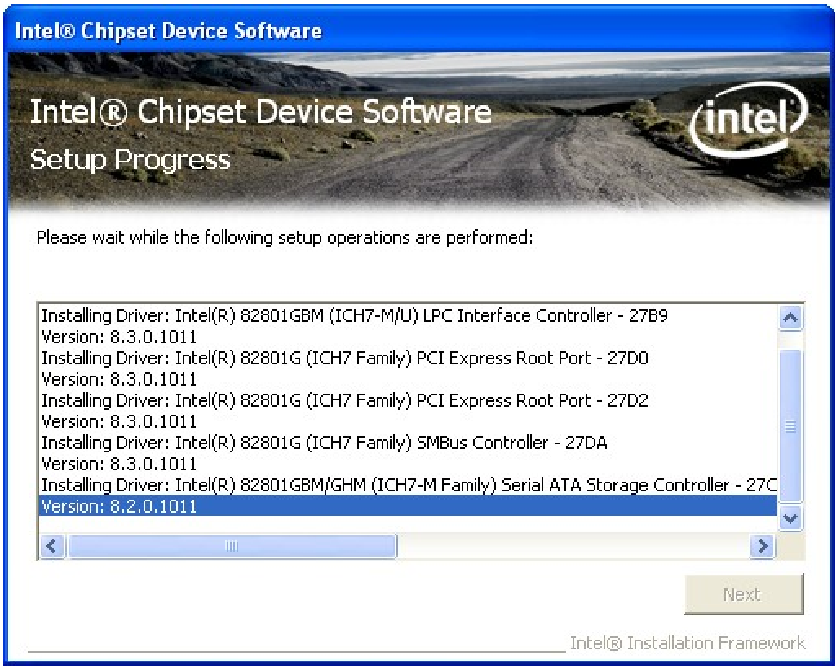


Figure 6-5: Chipset Driver Setup Operations

Step 12: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 13: The **Finish** screen appears.

Step 14: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon. See **Figure 6-6**.



Figure 6-6: Chipset Driver Installation Finish Screen

6.4 VGA Driver Installation

To install the VGA driver, please do the following.

Step 1: Access the driver list shown in **Error! Reference source not found.**. (See **Section 6.2**)

Step 2: Click “**2-VGA**”

Step 3: The VGA Read Me file in **Figure 6-7** appears.

Step 4: Click **Next** to continue.

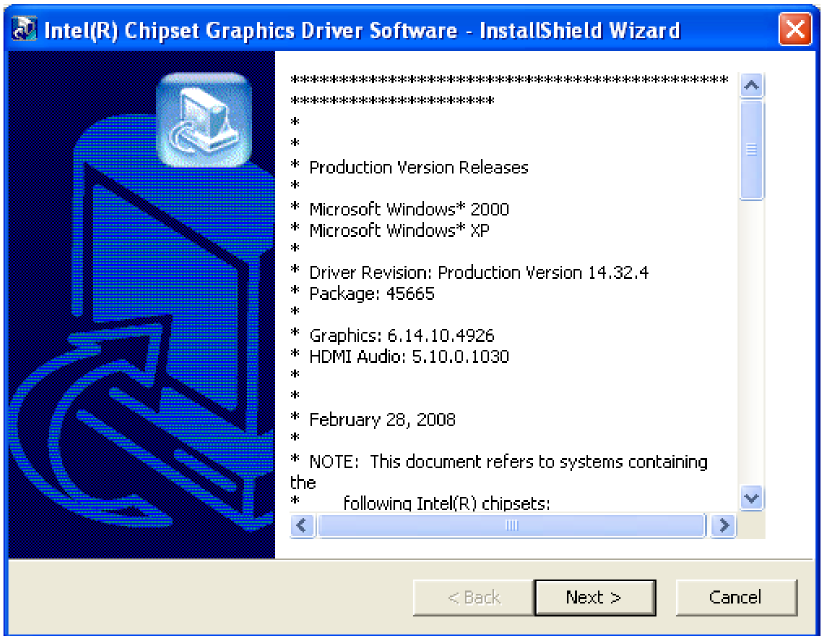


Figure 6-7: VGA Driver Read Me File

Step 5: The installation files are extracted. See **Figure 6-8**.

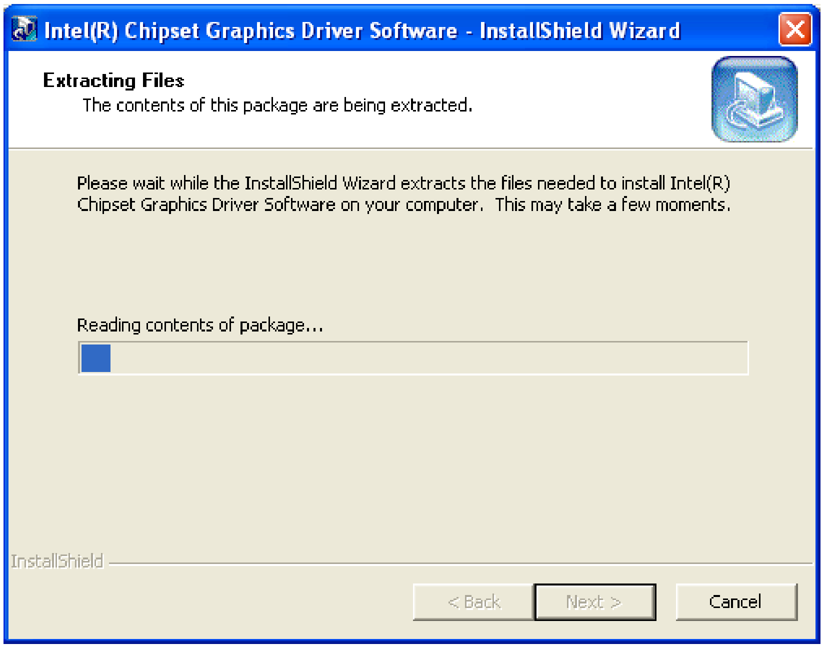


Figure 6-8: VGA Driver Setup Files Extracted

Step 6: The **Welcome Screen** in **Figure 6-9** appears.



Figure 6-9: VGA Driver Welcome Screen

Step 7: Click **Next** to continue.

Step 8: The license agreement in **Figure 6-10** appears.

Step 9: Read the **License Agreement**.

Step 10: Click the **Yes** icon to continue.

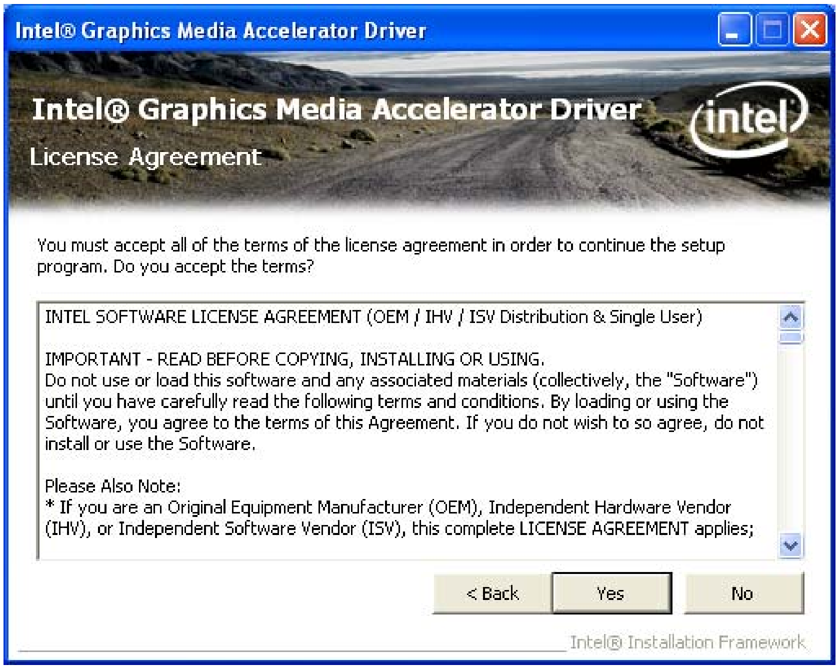


Figure 6-10: VGA Driver License Agreement

Step 11: The Read Me file in **Figure 6-11** appears.

Step 12: Click **Next** to continue.

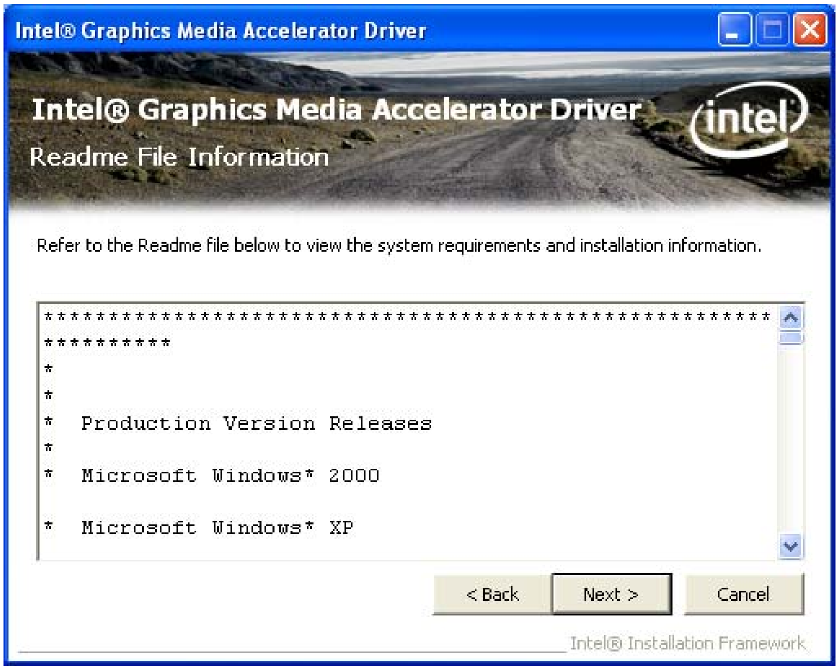


Figure 6-11: VGA Driver Read Me File

Step 13: **Setup Operations** are performed as shown in **Figure 6-12**.



Figure 6-12: VGA Driver Setup Operations

Step 14: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 15: The **Finish** screen appears.

Step 16: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon. See **Figure 6-13**.



Figure 6-13: VGA Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Access the driver list shown in **Error! Reference source not found.**. (See **Section 6.2**)

Step 2: Click “**3-LAN**”.

Step 3: The **Welcome** screen in **Figure 6-14** appears.

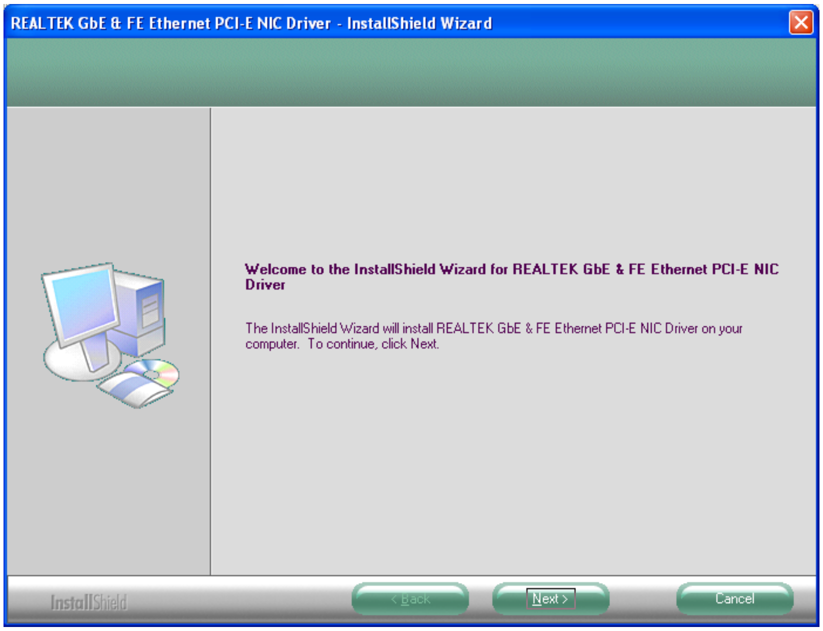


Figure 6-14: LAN Driver Welcome Screen

Step 4: Click **Next** to continue.

Step 5: The **Ready to Install** screen in **Figure 6-15** appears.

Step 6: Click **Next** to proceed with the installation.

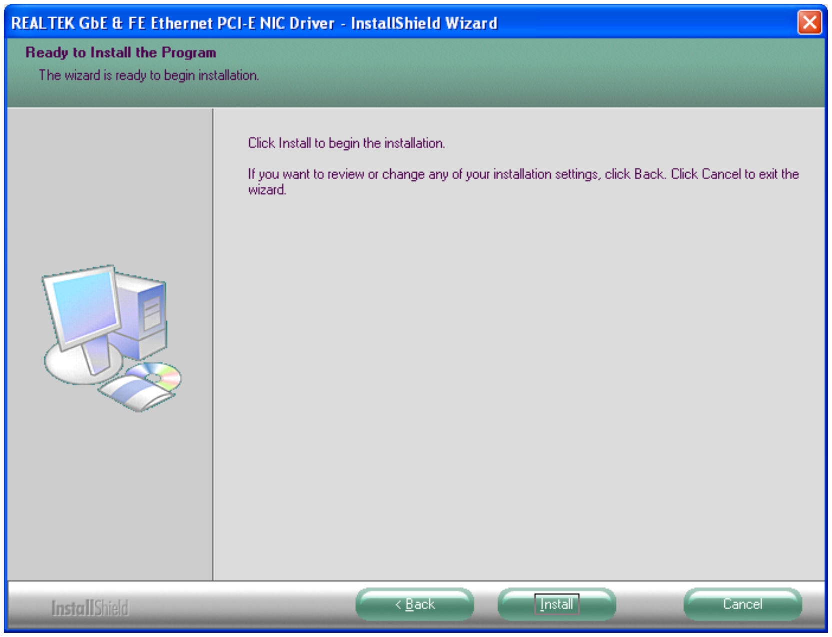


Figure 6-15: LAN Driver Welcome Screen

Step 7: The program begins to install.

Step 8: The installation progress can be monitored in the progress bar shown in **Figure 6-16**.

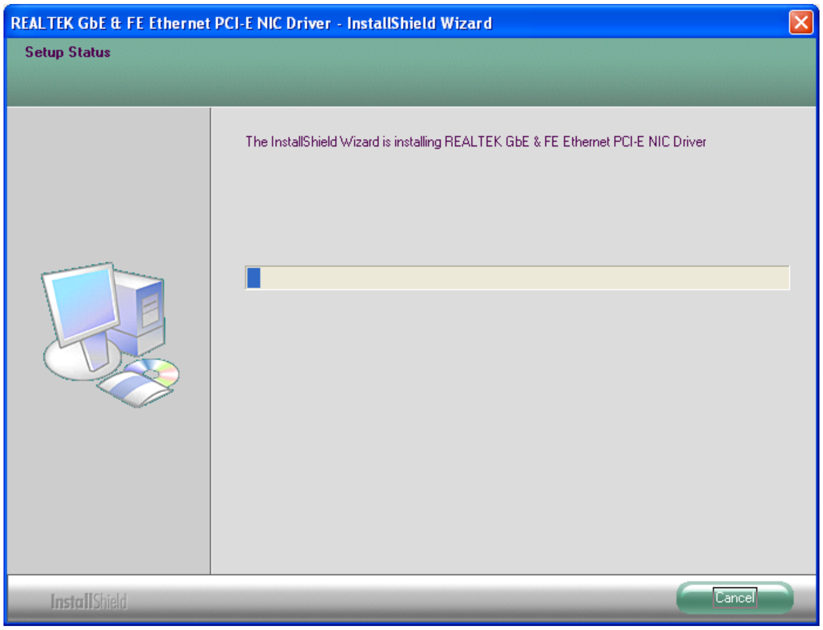


Figure 6-16: LAN Driver Installation

Step 9: When the driver installation is complete, the screen in **Figure 6-17** appears.

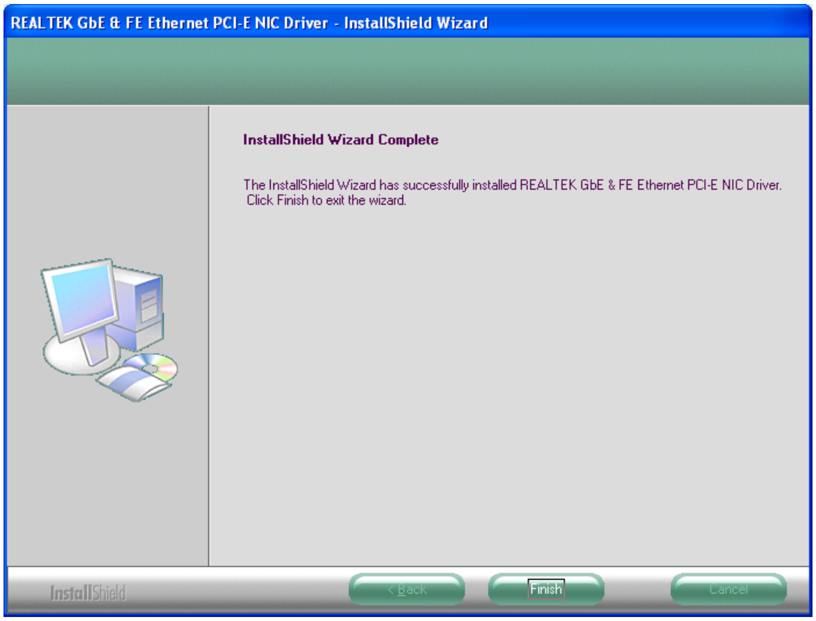


Figure 6-17: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the Audio driver, please do the following.

Step 1: Access the driver list shown in **Error! Reference source not found.**. (See **Section 6.2**)

Step 2: Click "**4-Audio**".

Step 3: The installation files are extracted as shown in **Figure 6-18**.

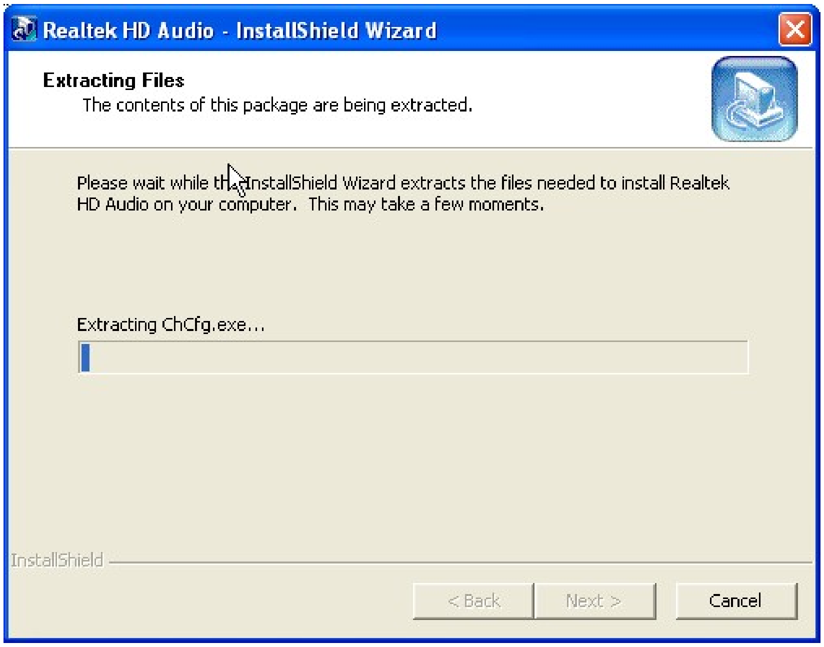


Figure 6-18: Audio Driver Installation File Extraction

Step 4: The Audio Driver Installation screen in **Figure 6-19** appears.

Step 5: Click **Yes** to install the audio driver.



Figure 6-19: Audio Driver Installation Welcome Screen

Step 6: The driver installation begins. See **Figure 6-20**.



Figure 6-20: Audio Driver Installation

Step 7: When the driver is installed, the driver installation finish screen in **Figure 6-21** appears.

Step 8: Select "**Yes, I wish to restart my computer now**" and click **Finish**.

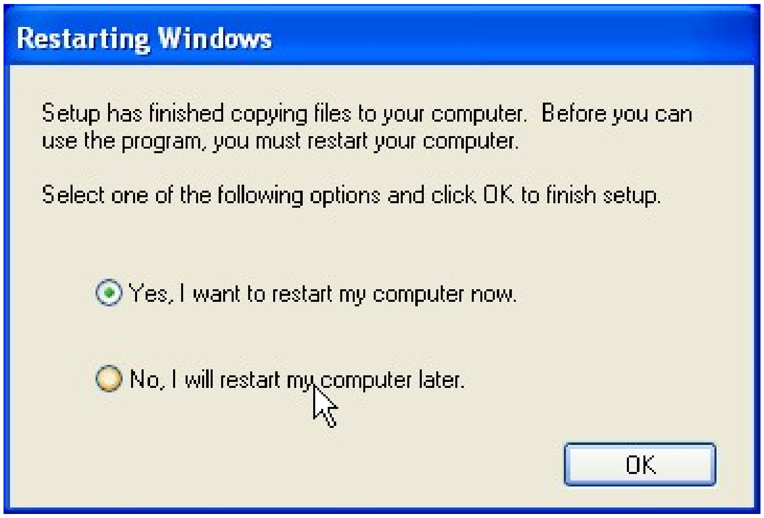


Figure 6-21: Audio Driver Installation Complete

Step 9: The system reboots.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Appendix

B

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

Appendix

C

Terminology

AC ’97	Audio Codec 97 (AC’97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.

DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the WAFER-945GSE is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
Sub-function:	
AL – 8	:Set the digital port as INPUT
AL	:Digital I/O input value

D.2 Assembly Language Sample 1

```
MOV     AX, 6F08H        ;setting the digital port as input
INT     15H              ;
```

AL low byte = value

AH – 6FH	
Sub-function:	
AL – 9	:Set the digital port as OUTPUT
BL	:Digital I/O input value

D.3 Assembly Language Sample 2

```
MOV     AX, 6F09H        ;setting the digital port as output
MOV     BL, 09H          ;digital value is 09H
INT     15H              ;
```

Digital Output is 1001b

Appendix

E

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table E-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

```
;
W_LOOP:
;
        MOV        AX, 6F02H        ;setting the time-out value
        MOV        BL, 30           ;time-out value is 48 seconds
        INT    15H

;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP        EXIT_AP, 1       ;is the application over?
        JNE    W_LOOP           ;No, restart the application

        MOV        AX, 6F02H        ;disable Watchdog Timer
        MOV        BL, 0        ;
        INT    15H

;
; EXIT ;
```

Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O
O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006						

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						